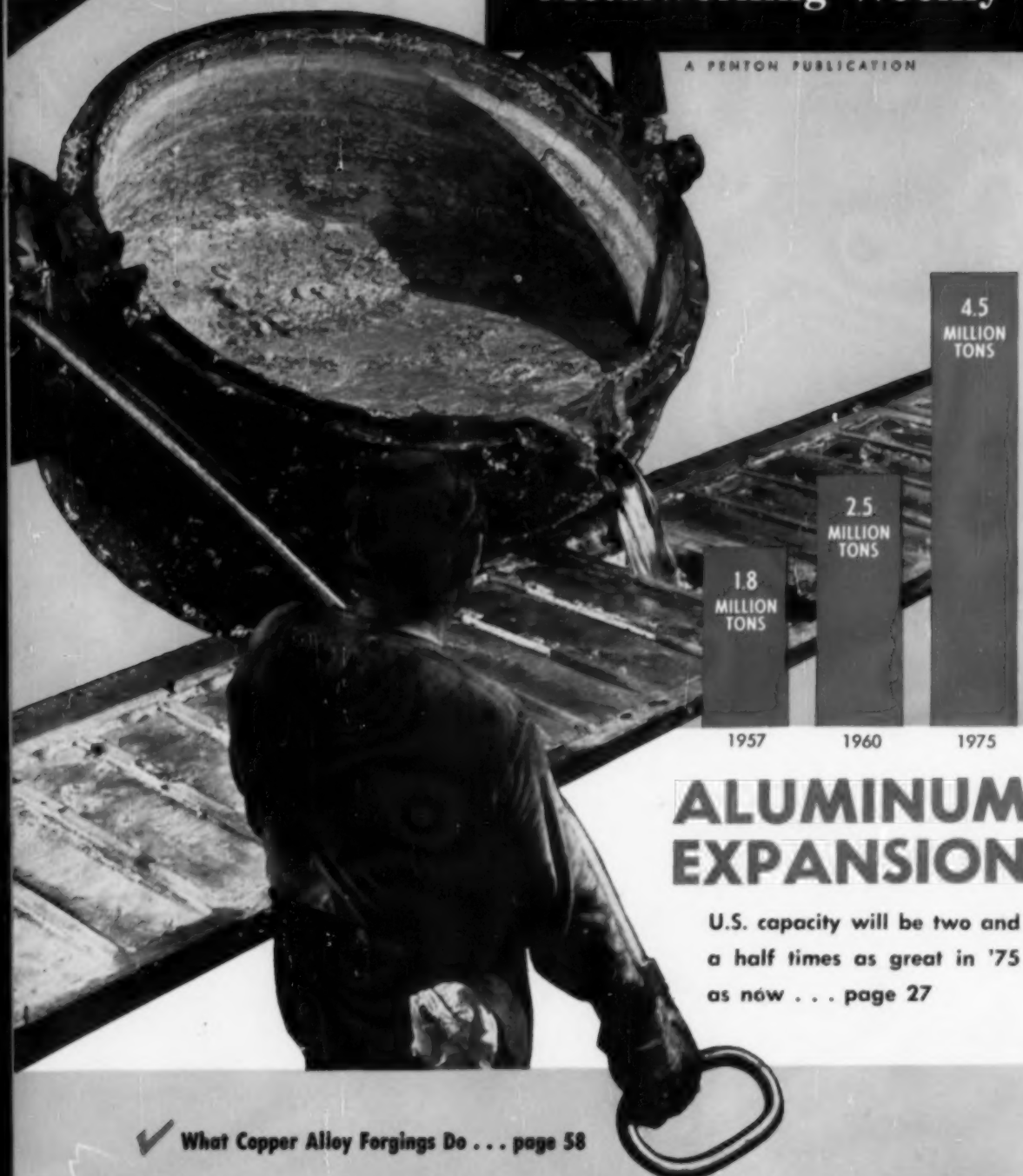
DECEMBER 31, 1956

STEEL
The Metalworking Weekly

A PENTON PUBLICATION



ALUMINUM EXPANSION

U.S. capacity will be two and a half times as great in '75 as now . . . page 27

✔ **What Copper Alloy Forgings Do . . . page 58**

✔ **Tool Steel Makers Eye Good Year . . . page 78**

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New Ideas IN EQUIPMENT FOR CONTINUOUS COATING LINES

● New ideas recently developed by Aetna-Standard make Continuous Coating Lines more efficient. One idea focuses on a new approach for **Loop Cars.** The use of Loop Cars eliminates deep loop pit excavation and keeps strip in full view for easier inspection.

New Aetna ideas contribute to an even better finished product. Space saving in the installation results in lower first cost. There is less equipment to buy and to install.

Aetna-Standard has installed more Continuous Galvanizing Lines than all other manufacturers combined.

AETNA • STANDARD

THE AETNA-STANDARD ENGINEERING COMPANY

GENERAL OFFICES: PITTSBURGH, PA. PLANTS: ELLWOOD CITY, PA., WARREN, OHIO

CONTINUOUS GALVANIZING LINES ● CONTINUOUS ELECTROLYTIC TINNING LINES ● SIDE TRIMMING AND SHEAR LINES AND OTHER FINISHING EQUIPMENT ● CONTINUOUS BUTT WELD PIPE MILLS ● SEAMLESS TUBE MILLS ● DRAWBENCHES AND OTHER COLD DRAW EQUIPMENT ● ROLLS AND CASTINGS ● EXTRUDERS, MILLS, PRESSES FOR RUBBER AND PLASTIC

Thousands of Bethlehem High-Strength Bolts were used to join structural members in framework for new Prudential office building in Jacksonville, Fla. *Architects:* Kemp, Bunch and Jackson. *Contractor:* Daniel Construction Company of Alabama. *Fabricator and Erector:* Ingalls Iron Works Company.

High-Strength Bolting Speeded Erection of New Office Building in Jacksonville

This handsome building encased in marble, limestone and pink granite is the South-Central headquarters of The Prudential Insurance Company of America, at Jacksonville, Fla. The 22-story structure has a steel framework of 5,893 tons, held together with thousands of Bethlehem High-Strength Bolts. This method of construction saved erection time, as the bolting was completed within a week after the last piece of steel was set.

High-strength bolting is rapidly increasing in popularity as a means of erecting steelwork economically. Bolted joints are made rapidly. The bolts, used with hardened washers, can be installed in seconds. A holding wrench grasps the bolt-head, and the nut is driven to predetermined tension with a calibrated pneumatic impact wrench. That's all there is to it! There's no fire hazard involved. Besides, the bolting operation is less noisy than riveting, making it more suitable for use in hospital and school zones.

Bethlehem High-Strength Bolts are made of carbon steel, and come in sizes to meet virtually every construction need. They are heat-treated by quenching and tempering, and meet every requirement of ASTM Specification A-325.

You'll find the nearest Bethlehem sales office glad to assist in answering your questions about high-strength bolting. Why not give them a call right now? Or drop a line to us at Bethlehem, Pa.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

Heald RED HEAD'S extra precision and low maintenance

NOW AVAILABLE TO ALL USERS

of boring and internal grinding equipment

HEALD Red Head Boringheads and Wheelheads have achieved an enviable reputation for extreme precision and exceptionally low maintenance, on Heald Bore-Matics and Internal Grinders in use throughout the entire metalworking industry. Heretofore, they have been available only as original equipment or replacement items for specific Heald machines.

Now, however, in response to a continual and ever-increasing demand — and in line with the Heald policy of building standard machines and parts — it has been decided to market all standard Red Head Boringheads and Wheelheads without restriction wherever practical. This means that the extra precision and low maintenance provided by Heald Red Heads are now available to all users or manufacturers of metalworking equipment, regardless, in most cases, of the type of machines on which they will be used.

The standard head types and sizes that can be supplied are fully described and listed in the Bulletins noted below.

RED HEAD
HEALD

HEALD PERMANENTLY-LUBRICATED BORINGHEADS

Designed to provide high, sustained precision with virtually no maintenance, Heald Red Head Boringheads are permanently lubricated —no grease or oil is ever needed. They run cooler, reduce heat distortion and maintain high accuracy at all speeds and loads. Spindles run in precision bearings, specially manufactured to Heald specification and individually tested and selected for each head. Write for Bulletin B-1, Issue 6.

HEALD HI-FREQUENCY WHEELHEADS

Providing proper speed for small-bore grinding, Heald Hi-Frequency Wheelheads deliver full power direct to wheel and eliminate drive upkeep costs. They can withstand momentary peaks of twice the continuous-duty rating. Those running over 30,000 rpm must be automatically lubricated by the Heald Oil-Mist system which also supplements effects of water cooling—others are permanently grease lubricated. Write for Bulletin 6-2, Issue 2.

HEALD PERMANENTLY-LUBRICATED WHEELHEADS

Heald Red Head Wheelheads incorporate the same high quality bearings and permanent, sealed-in lubrication as Heald Red Head Boringheads. They have repeatedly set the highest standards of accuracy, precision and surface finish. There are three general types: Quill Style, for a variety of work — Naked Style for high production on a single workpiece — Sleeve Style for large bores. Write for Bulletin 6-1, Issue 7.

IT PAYS TO COME TO HEALD

THE HEALD MACHINE COMPANY

Subsidiary of The Cincinnati Milling Machine Co.

Worcester 6, Massachusetts

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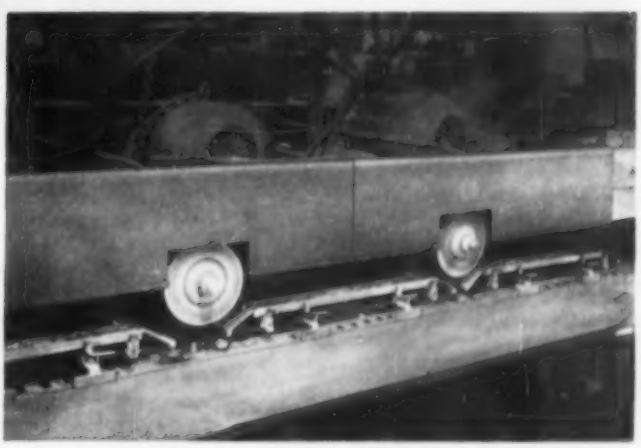
OSBORN BRUSHING METHODS *worthy of your confidence*

Start of a flawless finish

THE bright finish on trim parts that "dress up" thousands of products must start with a perfect, unmarred surface prior to final buffing and plating.

Osborn power-brushing has proven the ideal production method for removing draw marks, blending imperfections as an essential preliminary step, before buffing.

These outstanding results are another reason why Osborn power brushing has gained industry's confidence. An **O**sborn **B**rushing **A**nalysis, made at no obligation, will show how *you* can benefit from this advanced finishing method. Write *The Osborn Manufacturing Company, Dept. G-50, 5401 Hamilton Avenue, Cleveland 14, Ohio.*



A leading manufacturer of trim parts uses 16" diameter Osborn Fascut® Brushes, operating at 1700 rpm, to produce perfect plating surfaces.

Osborn Brushes

EXIDE-IRONCLAD BATTERIES

For electric industrial truck operation

Deliver the power over a wide range of temperatures

BATTERY FOR ELECTRIC INDUSTRIAL TRUCK. Exide-Ironclad Model TH. Write for Bulletin No. 5161.

At few places on earth do storage batteries ever encounter such extremes of cold and heat as are used to test Exide-Ironclad Batteries in the laboratory.

These tests prove that Exide-Ironclad Batteries can be depended upon over a wider range of temperatures than they are ever likely to be asked to endure. And they provide tangible extra assurance of dependability at all the more normal operating temperatures.

Extreme temperature performance is especially important when a battery must have continuous dependability. It is often at these extremes that a battery is most needed. And a battery cannot be called dependable unless it can be counted on every day—all of the time.

The high and low temperature performance of Exide-Ironclad Batteries is a direct result of their unique construction features and special engineering. In countless applications, these batteries have earned an unmatched reputation for long life and high capacity. When you need batteries for heavy duty uses, be sure to specify Exide-Ironclad. Write for detailed bulletin. Exide Industrial Division, The Electric Storage Battery Company, Philadelphia 2, Pa.

Exide®

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HERE'S HELP for your tooling problems

Looking for a tool steel to do a specific job? Want to know where to buy a finishing carbide? This guide has the answers. It is a single source of information on more than a thousand different tooling materials. Knowing the job to be done, you can determine, with the guide, what product to buy and where to buy it. Cross indexes make it easy to locate tool steels and carbides by tradename, or to compile a list of sources for a single type.

40 PAGES

Copies of the Guide to Tool Steels & Carbides are available from Editorial Service, STEEL, Penton Bldg., Cleveland 13, O., at the following prices:

1 to 10	$2.00 ea.
11 to 50	1.90 ea.
51 to 100	1.80 ea.
101 to 200	1.70 ea.
over 200	1.60 ea.

behind the scenes

Aluminum Boom

Things have a way of sneaking up on a body without a body being too aware of them; holidays, for instance, and anniversaries, and (gulp!) birthdays. Well, aluminum is like that, too. It never appeared, the story goes, until 1827, when a man named Wohler isolated a chunk in his laboratory. In 1920, 69,021 tons were produced; in 1945, the figure was 495,060. This year, it was 1.8 million, and it seems that no matter where you go you can't get more than 20 ft away from the stuff because it is on the ground, on the sea and in the air. Why, according to the television commercials, it's even flowing on us from Canada in an avalanche.

The story about this great aluminum expansion (page 27) is particularly timely. It has a general as well as a specific appeal. Perhaps the only persons who will find nothing of interest in the article are a couple of Jivaro head-hunters, but there are few STEEL subscribers among those fellows, anyway.

What's with Europe

The European report (page 38) gives us a summation of metalworking in the countries west and east of the Iron Curtain. Our correspondents experienced understandable difficulties (that's a high class way of saying that our boys had rough going) in assembling their findings after Colonel Nasser latched on to the Suez Canal, and the politicians began choosing up sides.

This general report on European industry will set you thinking. Vincent Delport, STEEL's European manager, masterminded the assignment, and turned over sufficient information to fill one of those celebrated White Papers that statesmen sometimes talk about. Have you ever read a White Paper? Most of them are longer than *Gone with the Wind*. STEEL's report, however, is edited right down to the meat, and will make excellent year-end reading.

At this point in the text we should make provision for a subhead because we are going to switch to another subject, but this is a bad place for a break. Anyway, our subject doesn't call for a subhead—it calls for the title page—because it is nothing less than STEEL's monumental Yearbook and Planning Guide. You will receive this important volume a week from today. We know one willful fellow who was surly enough to declare that the Yearbook served as a splendid doorstop, but it should be remembered that he had a brother, Joe, in a jar of alcohol at Harvard, and that he frequently exhibited some of the symptoms that had endeared Joe to the medical faculty.

Seriously, metalworking management everywhere is looking forward to this significant issue of STEEL. Advertising and editorial pages will be packed with new ideas. Particularly impressive will be "What Metalworking Management Expects in 1957," a roundup of information from some 7500 metalworking executives. This candid survey presents reliable information on what 1957 will bring in terms of production volume, sales, prices, employment, manufacturing costs, plant expansion, new equipment purchases and other equally important developments. This survey has proved remarkably accurate in the past.

The Yearbook will carry articles on the newest of new technical developments, what to expect from Washington and Detroit, a forecast of metalworking's fabulous future, a chronology of events that affected metalworking during 1956 and other important features.

Clocks Again

Bill Mueller of Western Electric Co.'s Hawthorne Works, Chicago, is on the right track in the matter of springing swimming Joe. Joe, to escape, must make a statement that will automatically cancel itself under the terms. The prisoner says flatly: "I shall die by being boiled alive." And now this one: At precisely what time between 2 and 3 o'clock will the minute hand be as far from 6 as the hour hand is from 12?

Shrdlu

(Metalworking Outlook—Page 21)

toughest

Royal Blue rope is made of the *toughest* rope wire ever developed... Roebling Type 1105

John A. Roebling's Sons Corporation, Trenton 2, N. J., Subsidiary of The Colorado Fuel and Iron Corporation BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 61 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 2340 GLENDALE-MILFORD RD., EVENDALE • CLEVELAND, 19235 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • PITTSBURGH, 1723 HENRY W. OLIVER BLDG. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK 6.

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Which locking system do you prefer?

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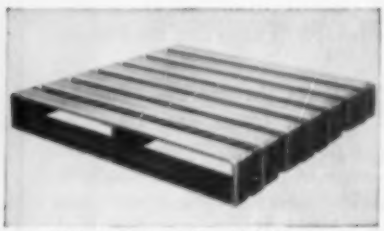
PALLET RACKS permit convenient storage of bulky, irregular materials that are normally unstackable. Odd lots are stored with space-saving economy. Simply palletize them all, and load pallets on rack. The rack, not the load, bears all the weight. Two-way entry permits loading and unloading from either side. Republic Pallet Racks, shipped knocked down, are easy to assemble. Sizes are available to fit your standard pallets.



STEEL PALLETS, made at Republic's Pressed Steel Division, are designed to eliminate the nuisance and expense of repairing broken deck boards, protruding nails, split stringers and joint failures. They're strong, rigid, have no sharp edges or projections to damage containers or workmen. Republic Engineers will help you develop a design that meets your specific requirements. Send coupon for literature.

WEDGE-LOCK STEEL SHELVING, the world's strongest, is designed to gain strength as the load increases, thus permitting higher stacking without distortion or instability. Another product of Republic's Berger Division, Republic Wedge-Lock permits efficient use of overhead space. Wedge-Lock is easy to assemble; and later rearrange to suit changing needs. Mail coupon below for additional information on complete shelving line.

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and Steel Products

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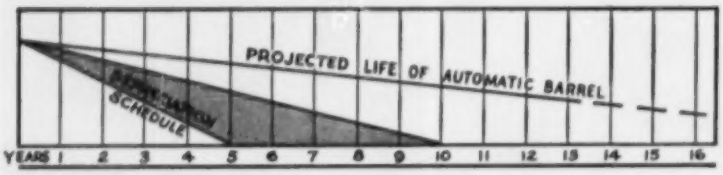
A HOT IDEA FOR COOL PROFITS

THE FINISHING TOUCH

by A. B. HOEFER
Vice-President
FREDERIC B. STEVENS, INC.

Stevens Automatic Plating Barrels Adaptable to Any Situation

IT'S GOOD TO KNOW WHEN YOU ARE INVESTING in a plating machine that Stevens units can be designed so that more than one type of plating can be done on one machine. Also, that changes can be made in the future to meet any specifications you may have. We've changed over a good number of Stevens machines in our time. That's why there are so many Stevens machines in use far beyond their depreciation schedule.



THERE ARE MANY OTHER SAVINGS you can enjoy beyond long life. Stevens Automatic Barrel machines require only one employee to operate the machine. These units are completely automatic, because the open end barrel is loaded when in a vertical mouth-upward position and automatically unloaded by tilting the barrel downward. There are no lids to fasten or unfasten.

POSSIBLE MIXING OF PARTS IS ELIMINATED in the Stevens automatic barrel. Small, special loads can be conveniently run without penalizing the productive capacity of the machine and without the inconvenience of partitioned cylinders. Stevens Automatic Barrel Machines are used for varied processes that include copper strike; copper, nickel, tin, brass, zinc and cadmium plating; phosphating; alrocing; dichromating; cleaning and bright dipping.

THE SIMPLE COMPACT DESIGN of this machine permits production capacities as high as 4,000 pounds per hour. Simplicity of design makes it equally practical to distribute the capacity between two or more machines to provide flexibility in plating thicknesses and production.

Let us give you more details on Stevens Automatic Barrels. Write us today, Frederic B. Stevens, Inc., 1814 Eighteenth Street, Detroit 16, Michigan.

FREDERIC B. STEVENS INCORPORATED
YOUR METAL FINISHING SUPERMARKET
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METAL FINISHING EQUIPMENT AND SUPPLIES FROM CASTINGS OR STAMPINGS TO FINISHED PRODUCT

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LETTERS
TO THE EDITORS

Association Seeks Reprints

We wish to compliment you on your excellent article, "Open Letter to Job Shops" (Dec. 3, page 79). I am secretary and treasurer of the Pacific Spring Manufacturers' Association, and we are interested in obtaining 15 reprints.

William Glynn
General Manager
Griffin Coil Spring Co. Inc.
Los Angeles

Aircraft Article Is Pertinent

Your article, "Aircraft: Feast, Not Famine" (Nov. 26, page 57), is most timely and pertinent. If you could send 30 copies, the members of our student committee on "U.S. Aircraft Production" would profit from and enjoy it.

Col. Thomas L. Crystal
Industrial College of the Armed Forces
Washington

Traffic Control Cuts Cost

I read with interest your article, "Let Traffic Managers Manage" (Nov. 26, page 68). There is considerable need for this type article, and I am happy to see you publish it.

Through our efforts in the traffic section of the television department of the General Electric Co. (Syracuse, N. Y.), we know our transportation expense can be reduced considerably through proper traffic control, administration and co-operation. Considerable savings have already been realized, but we feel we have only scratched the surface.

I would appreciate a copy for my file.

D. F. Semon
Administrator-Traffic
Television Receiver Department
Appliance & Television Receiver Division
General Electric Co.
Syracuse, N. Y.

Reprint Put To Use

We thought you would like to know what happened to the two reprints of your Program for Management article, "Know Your Costs" (Mar. 19, page 83).

One copy was passed around the purchasing department, and its ideas were discussed in an informal meeting.

The other copy was sent to the office of the works manager, where it was temporarily buried. Within the past week, the article re-appeared, and the production manager discussed it with his department heads.

Whether any action will result, is still a question. While there may not be any concerted effort, I am sure that

(Please turn to page 12)

BEST
BY ANY TURNING TEST

At Taylor Instrument Companies, Rochester, N. Y. "Manufacturing costs cut 74% while contouring stainless at 1000 sfpm to 16 mu-in. finish."

Jones & Lamson turret lathes are built and powered to produce...

MORE CHIPS per tool
MORE PIECES per hour
MORE PROFIT per job

than any other turret lathe of comparable size!

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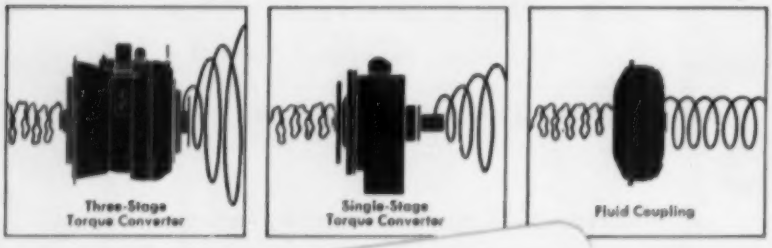
JONES & LAMSON MACHINE COMPANY, 517 Clinton St., Springfield, Vt., U.S.A. J&L **MACHINE TOOL DIV.**

converter
or coupling?
...for unbiased*
recommendations,
consult
Twin Disc!



*Unbiased because Twin Disc—the world's largest manufacturer of both fluid and friction drives for industrial powered equipment—offers *a complete line* of fluid drives . . . torque converters (single-stage *or* three-stage) from 30 to 1000 hp . . . fluid couplings from ¾ to 850 hp . . . to meet virtually every heavy-duty requirement for fluid power transmission.

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Friction Clutches and
Fluid Drives

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Branches or Sales Engineering Offices: Cleveland • Dallas • Detroit • Los Angeles • Newark • New Orleans • Tulsa

LETTERS

(Concluded from page 10)

each individual will attempt to apply the principles to his department.

I think STEEL is doing a fine job on its Program for Management articles.

J. W. Cheetham
Director of Purchases
Evans Products Co.
Plymouth, Mich.

Interested in New Look

Please send three copies of your article, "Metal Powder Parts Get New Look" (Dec. 3, page 121), sixth in your Production Ideas series. It is of extreme interest to us.

Anthony J. Zino Jr.
Vice President-Sales
Dixon Sintaloy Inc.
Subsidiary of Joseph Dixon Crucible Co.
Stamford, Conn.

Permanent Metal Marking

In the Oct. 15 issue, there was an article, "Electrolytic Marking: It's Versatile" (page 139). It was based on information from Electromark Corp., Cleveland. I would appreciate this company's address.

Arthur J. Guzinski
4105 Lark St.
San Diego, Calif.

• *It's located at 2093 E. 19th St., Cleveland, O.*

Brainstorming Article Wanted

We are interested in getting tear sheets of the Program for Management article, "Ideas for Industry" (Apr. 23, page 105). We are assembling the best information available on "brainstorming" and this article was recommended to us.

Don Warrenbrand
Ad Librarian
Allied Purchasing Corp.
Subsidiary of Allied Stores Corp.
New York

Data on Aircraft Design

Your article, "Stainless in Aircraft Design," Part I (Nov. 5, page 142) and Part II (Nov. 12, page 152), has been brought to my attention. It would be an interesting addition to our "Engineering Handbook." We would appreciate 24 copies.

Ladislav Kadlec
Manager-Staff Engineering
Avien
Woodside, N. Y.

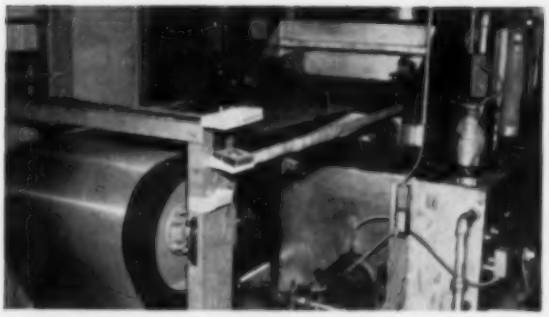
Oxygen Converter Capacity

Your article, "Steel Expansion Rolls Along" (Sept. 17, page 134), states that the total annual capacity of four oxygen converters to be installed by Jones & Laughlin Steel Corp. and Kaiser Steel Corp. will be 914,000 tons.

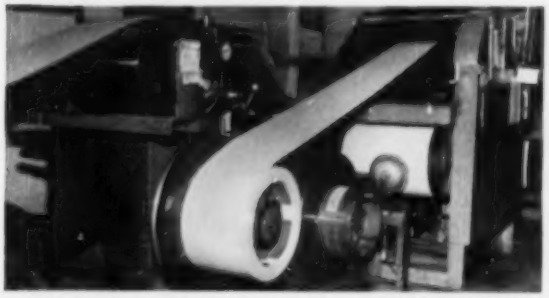
This should be 1,476,000 tons. Jones & Laughlin's installation will be 756,000 tons, Kaiser Steel's, 720,000 tons.

Totaling these two installations, plus McLouth Steel Corp.'s current production, we arrive at approximately 2 million tons—the amount of oxygen converter steel that will be made when the plants are in operation.

R. A. Bateman
Manager-Public Relations
Kaiser Engineers
Division of Henry J. Kaiser Co.
Oakland, Calif.



Strip is re-coiled after its treatment with Bonderite, corrosion resistant paint bond.



Painted metal is slit to desired width and coiled again as it emerges from finishing machine.

Re-coiled, finished metal is cut, formed, and inspected here. No loss of paint adhesion.

Painted stock is fed into punch press for blanking into various shapes and sizes.

Photos courtesy Hastings Aluminum Products, Inc.

Bonderized... Painted... Formed...

NO LOSS OF PAINT ADHESION!

Here's a production wrinkle that more and more manufacturers are using: Finish metal in the strip, then fabricate the product.

The technique applies equally well on steel and aluminum. First, run the strip through the Bonderite machine to produce the phosphate integral surface that supplies a secure anchor for the paint. Next, run the Bonderized strip through roll-coat painting and the bake oven. The painted coils of metal are ready for fabrication, and the finish doesn't crack, chip or craze as it is formed, drilled, and punched.

Fabrication after painting, made possible by Bonderizing, saves money by reducing labor, handling and manufacturing area requirements, and allows higher production rates.

Write or call for more information on how you can finish before fabrication in your plant.

Bonderite, Bonderizing, Bonderized—Reg. U.S. Pat. Off.

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Since 1914 — leader in the field

BONDERITE	BONDERITE and BONDERLUBE	PARCO COMPOUND	PARCO LUBRITE	TROPICAL
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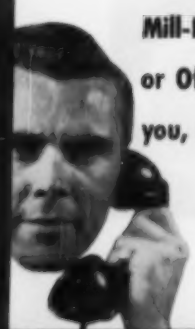

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Coming Jan. 7 IN STEEL

What Metalworking Management Expects in 1957

No crystal ball here: Just the facts. STEEL's annual survey of 7500 managers of metalworking plants queries them on their expectations for their own plants. That's the best sample of grass roots thinking in metalworking available.

We don't have to knock on wood when we point out that previous surveys have been remarkably accurate: Our respondents know what they're talking about, because they know their own plant operations.

A year ago they predicted the growing market for metalworking's products in 1956 within 2 per cent; two years ago they called the turn on the 1955 boom; 10 years ago they predicted the rising demand for metalworking's products in 1947.

What will be the score in 1957 on production? Employment? Costs and prices? New products? Expansion? Research? See your Jan. 7 issue of STEEL.

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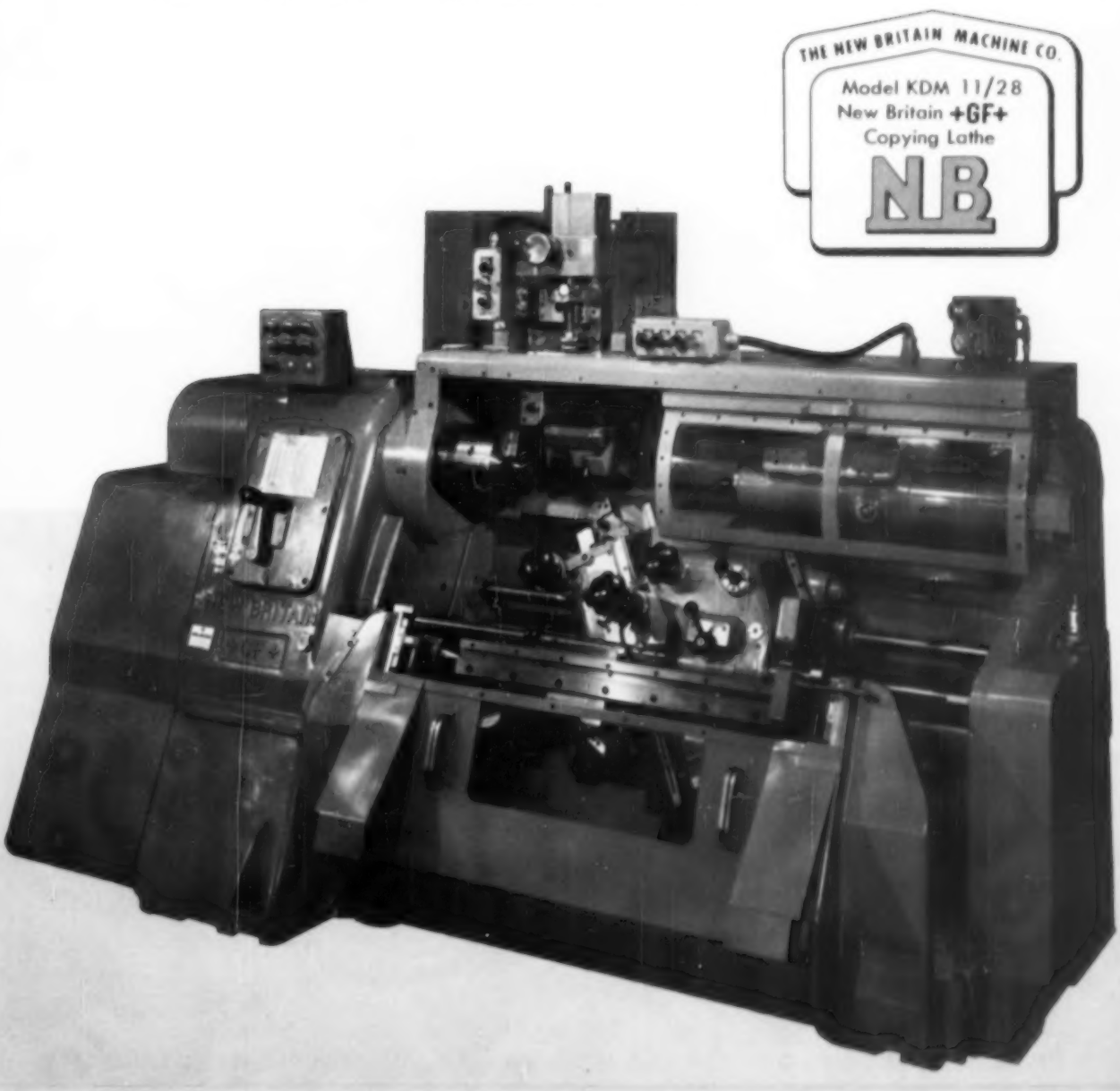

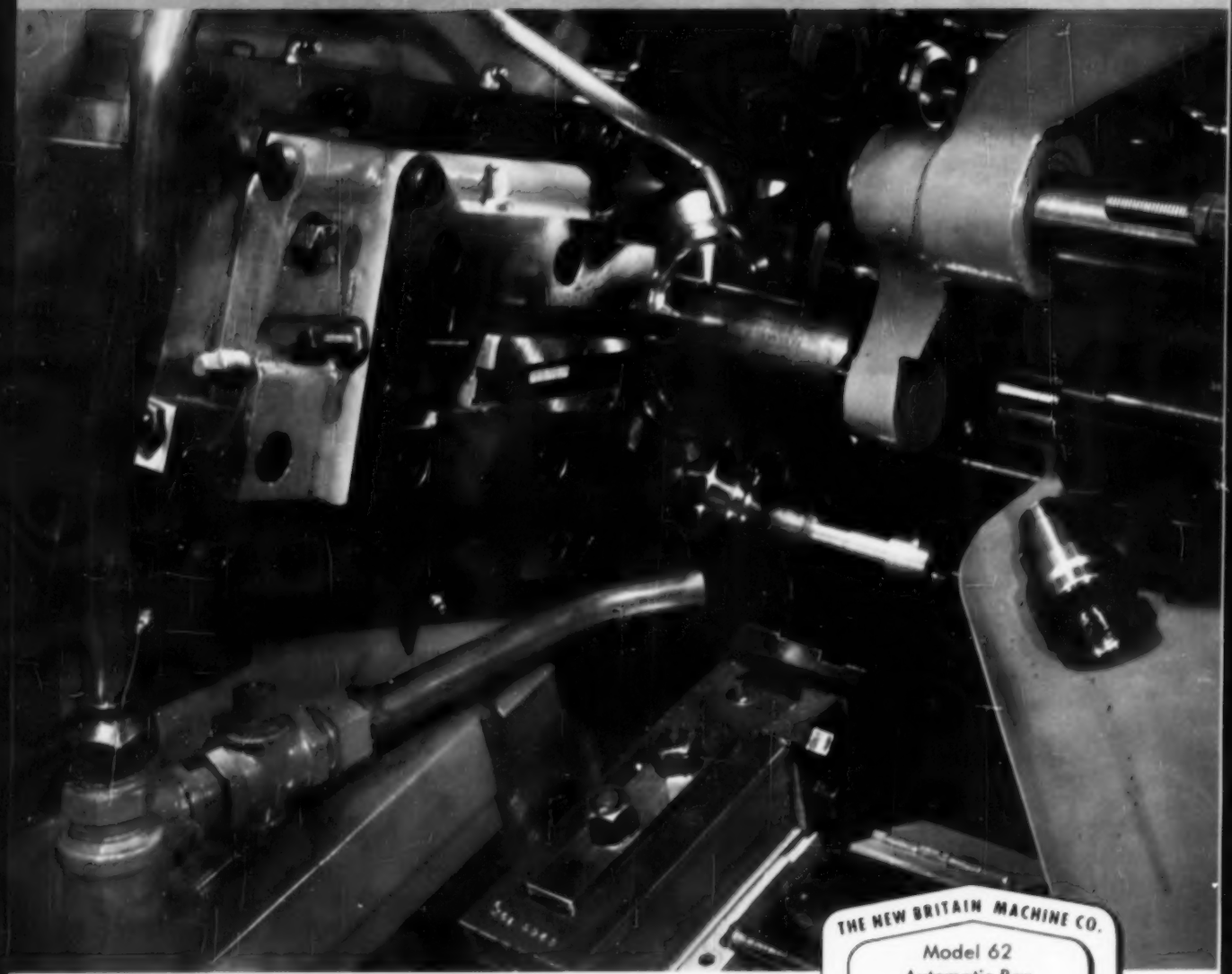

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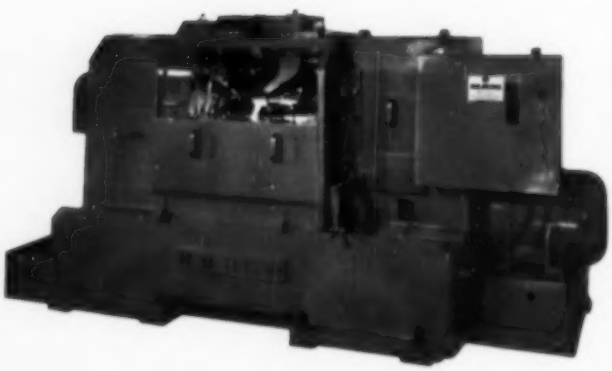

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Two new sinter plants, with a combined annual capacity of over 10,000,000 tons, are being built by Dravo. Each plant will contain three huge sinter machines for processing iron ore fines into clinkers suitable for charging blast furnaces.

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Dravo's engineering and construction skills play an important part in making new processes and techniques available to industry. For information on any of the products or services listed below, write DRAVO CORPORATION, PITTSBURGH 22, PENNSYLVANIA.

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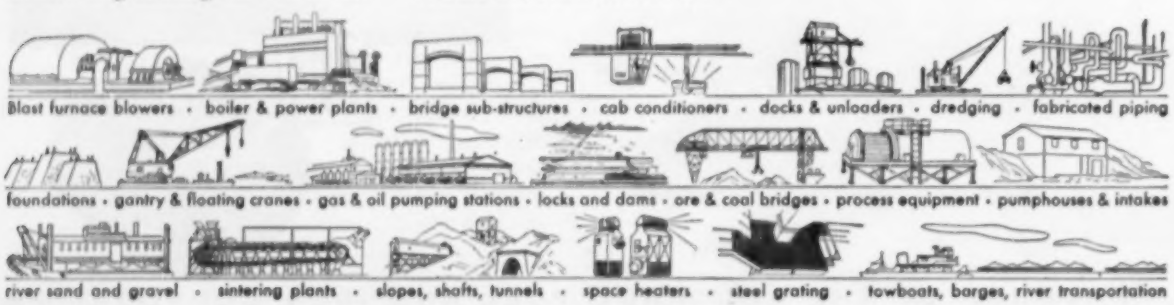
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Metalworking Outlook

No Tax Aid for Steel Expansion

Steelmen are still considering what to do about expansion plans following the Dec. 26 announcement that the government had turned down applications for tax help on $2.3 billion of proposed projects. The U.S. also refused to give shipbuilders priority in getting steel plates. Of 228 goals once set for which fast tax amortization was possible, only 22 are still open. Of the 22, these are of interest to metalworking: Facilities to produce chromite, manganese, mercury, nickel, selenium, steam boilers and turbines, steel castings, tankers, oil and gas pipelines and storage facilities and scientific instruments.

Buyers Optimistic About 1957

Purchasing agents are optimistic about 1957. Some 34 per cent responding to a survey by the National Association of Purchasing Agents, think the first six months will be higher than the corresponding 1956 level. Only 5 per cent see it lower. An even greater number, 42 per cent, think the full year will surpass the year now closing. Some 15 per cent predict a poorer 12 months. The remaining don't expect any difference in the periods. At year end, order backlogs are declining; inventories are up significantly; prices continue upward, but at a reduced rate.

How Much Price Increase?

The wholesale price index will reach 115.97 by next July 1, predicts the National Association of Credit Men. Peak figures were 111 in 1953 and 1954; 111.7 in 1955. At mid-1956 the index was 114.2. It's about 115.5 now (1947-1949 = 100).

Steelworkers Get 3 Cents More

Steel companies that have agreements with the United Steelworkers of America will pay a 3-cent-per-hour cost-of-living increase effective during the first pay period of the new year. The adjustment is based on the Bureau of Labor Statistics' consumer price index and calls for an increase of 1 cent per hour if the index rises over 116.6; 2 cents if the index registers 117.1; 3 cents if it reaches 117.5; and 4 cents if it gets to 118. The index was 116.2 on June 15 and advanced to 117.8 on Nov. 15.

Mr. McDonald Goes Electioneering

Top brass of the United Steelworkers will go electioneering in January. A series of regional meetings, ostensibly to discuss arbitration, job classification and contract provisions, will also serve as platforms for President David McDonald, Vice President Howard Hague and Secretary-Treasurer I. W. Abel. They will be opposed for those offices in the union's election Feb. 12. An unprecedented opposition slate will be led by Don C. Rarick, who has headed the protest against the $2-a-month increase in dues. The union leaders' actions indicate concern at the opposition's strength, but

odds still favor the incumbents. As part of his campaigning, look for more statements from Mr. McDonald like that just before Christmas when he called for stable steel prices.

Steel Spending Will Rise

The steel industry will have to spend more than $1 billion in each of the next five years to replace worn and obsolete facilities, says Max D. Howell, executive vice president of the American Iron & Steel Institute. The amount the industry can recover under depreciation will fall about $3 billion short of the $5-billion replacements needed. Billions more will have to be spent to finance expansion. Some $8 billion has been spent by the industry for new equipment and construction since the end of World War II.

Electronics To Grow 10 Per Cent

The radio-electronics-television industry increased in size by 15 per cent in 1956 and will grow 10 per cent more in 1957, predicts Dr. W. R. G. Baker, president of Radio-Electronics-Television Manufacturers Association and a General Electric Co. vice president. The industry will approach $5.9 billion in 1956 production. When revenues from distribution, servicing and broadcasting are added, the figure nears $12 billion. In the year just ending, military electronics sales reached $2.7 billion, 10 per cent higher than in 1955. In industrial electronics, semiconductors, industrial or closed-circuit television and computers showed the most outstanding growth in 1956 and will continue to gain.

Seaway Too Shallow?

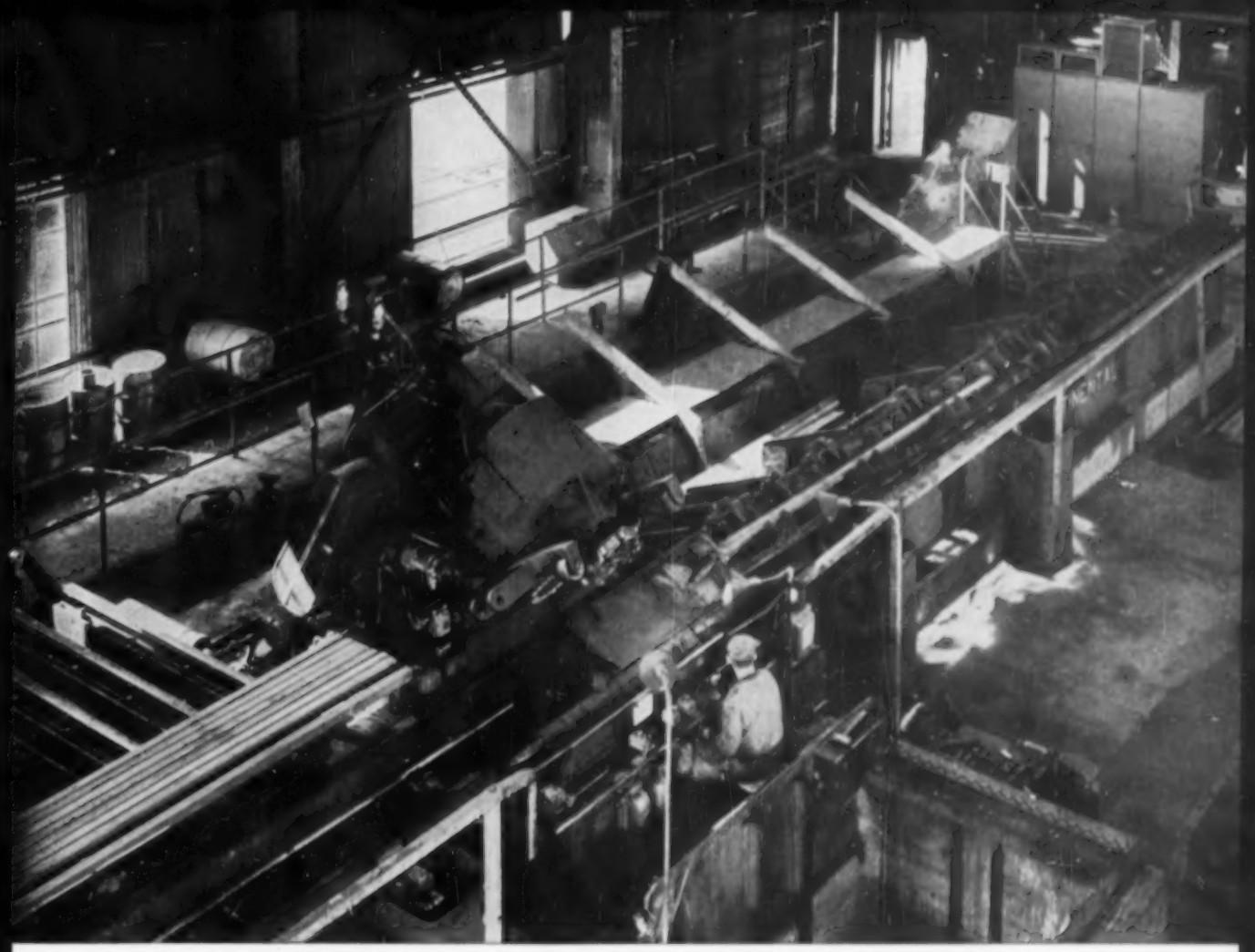
The 27-ft Great Lakes-to-sea waterway scheduled for opening in 1959 may be obsolete even before it's finished. Planning for the St. Lawrence link was based on the outlook back in the 1930s when a 27-ft channel was believed adequate. Now a deeper channel, possibly 35 ft, may be desirable for larger vessels in the 1960s. Raymond F. Stellar, engineer for St. Lawrence Seaway Development Corp., points out that the channel may be deepened to 30 ft without major new construction, but the additional 5 ft would be costly.

Rezoning in Chicago

Look for a hassel in Chicago over a proposed city-wide rezoning amendment. Protests come from steel and paint industries. They assail provisions that clamp strict controls on smoke, noise, odors and vibrations. They maintain performance standards are unrealistic and warn that they would be forced to move out of the city for further expansion if the ordinance is passed and enforced.

Straws in the Wind

Eastern railroads put the 7 per cent freight rate increase into effect Dec. 26 . . . Westinghouse Electric Corp. expects 1957 sales to exceed the 1954 peak of $1.6 billion . . . British steelmakers thus far are maintaining production despite the 10 per cent cut in fuel oil and expect to produce 22 million net tons of steel in 1956; in some cases, fuel substitutes have been found, such as coal tar.



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The chipper is equipped with special interlocking devices which eliminate unsafe operation. Usual chipping bay hazards such as high pressure air lines, improperly handled chisels, and flying chips are removed. The Continental Chipper accommodates billets up to 30 feet in all merchant and bar mill sizes.

For complete details, write for illustrated booklet.

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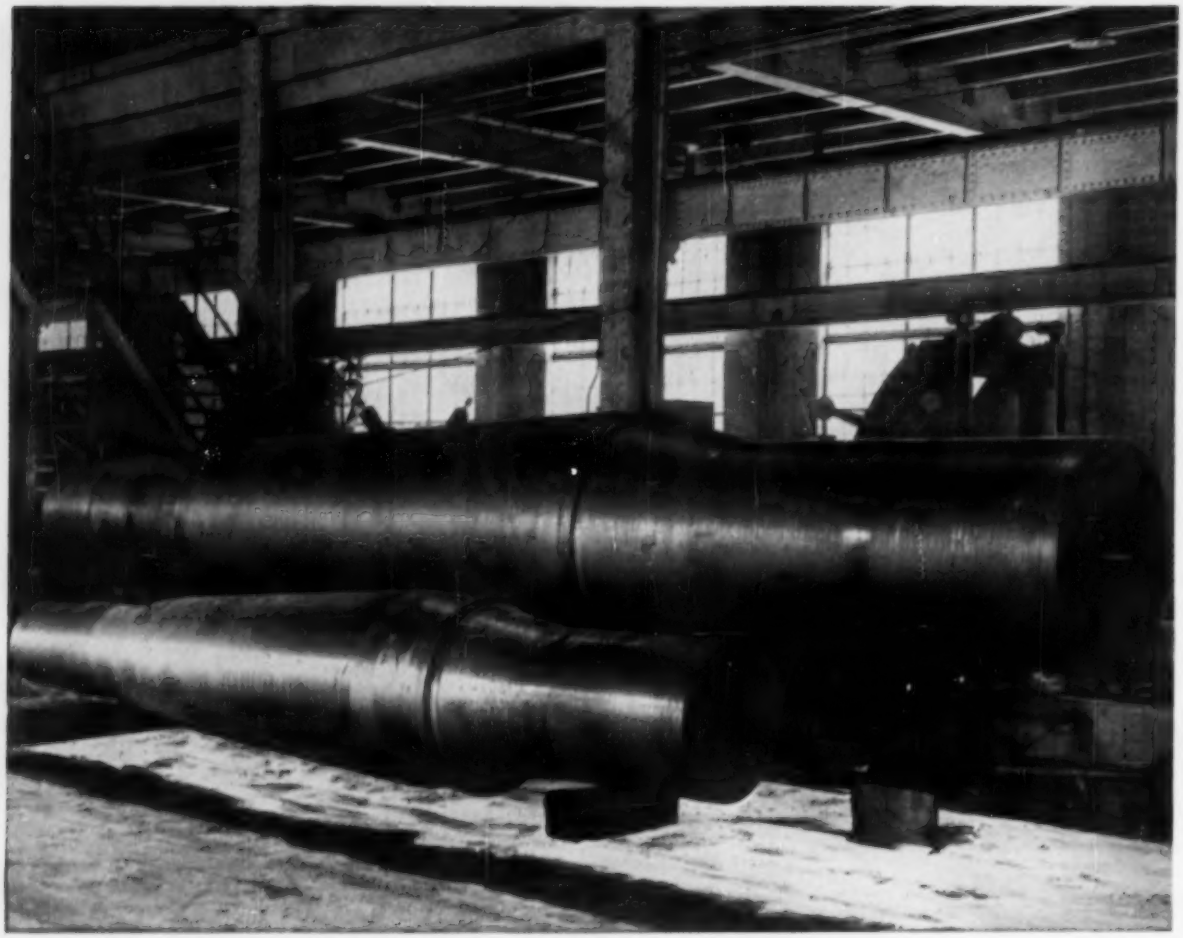

*Forged from 3½% Nickel Steel — These gyratory crusher shafts weigh 102,000 and 34,000 lbs. and are 25 and 17 feet long respectively. They were produced by Bethlehem Steel Company, Steelton, Pa.

*In large forgings like this...**

You get desired properties reliably with Nickel Steel

Usually husky parts like this cannot be quenched without special facilities.

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THE INTERNATIONAL NICKEL COMPANY, INC. 67 Wall Street New York 5, N.Y.

1956: A Good Year

Even though final statistics are not in, the pattern for 1956 is clear enough for you to take a look at your business against the backdrop of the general economy. Here are a few yardsticks:

People earned more in 1956 ($324 billion vs. $306 billion in 1955); spent more ($265 billion vs. $254 billion); paid more taxes ($38 billion vs. $35 billion); and saved more ($21 billion vs. $17 billion).

Gross national product (total U.S. production of goods and services) was at a record $411 billion, up $20 billion or 5 per cent from the 1955 mark. About half the gain was due to the increased physical volume of goods, the remainder to a dose of mild inflation.

At 143, the Federal Reserve Board's index of industrial production (based on 1947-1949 as 100) was 3 per cent higher than the 139 registered in 1955. The value of the dollar, using the 1947-1949 base, sagged 2.8 cents to 87.5 cents during the period.

Total metalworking sales rose 5.5 per cent—from $128 billion in 1955 to a new high of $135 billion in 1956. Machinery sales increased 15 per cent ($40.8 billion in 1955 vs. $47 billion in 1956); primary metal sales, 8 per cent ($26.4 billion vs. $28.4 billion); and fabricated metal products, 10 per cent ($16 billion vs. $17.6 billion).

Sales of instrument makers about held even ($3.7 billion vs. $3.6 billion), while transportation equipment sales dropped 7 per cent ($41.1 billion vs. $38.3 billion).

The 5.7 million employees in metalworking earned an average of $2.15 an hour in a work week averaging 41.1 hours. In 1955, about the same number of workers earned an average of $2.05 an hour in a week averaging 41.3 hours.

At $42.5 billion, corporate profits before taxes (*Standard & Poor's* estimate) were a shade less than the $42.7 billion earned in 1955.

Despite its problems and challenges, most companies will put 1956 down in their books as a good year. We hope it was a good year for you, too.

Irwin H. Such
EDITOR-IN-CHIEF

BEAUTY
that's more than skin deep!

Photo, courtesy Hemp and Company, Incorporated, Macomb, Illinois.

How THE HOUSE OF STAINLESS Combines Metallurgical Service and Material to Help Produce a Better Product

THE NEED: To meet the demand for an all-weather, any-climate marine model jug, the manufacturer of the famous line of Little Brown Jugs had to have a material that would combine many different qualities in the product. Style, beauty, ruggedness, and—above all—positive resistance to corrosive attack.

THE ANSWER: As far as the material was concerned, there was only one answer—stainless steel. However, to assure proper fabrication of this new Viking all-stainless model, Hemp engineers consulted with CSS metallurgists. Through this collaboration, the most practical procedures were developed for the deep-drawing and buffing operations that made this high quality jug possible.

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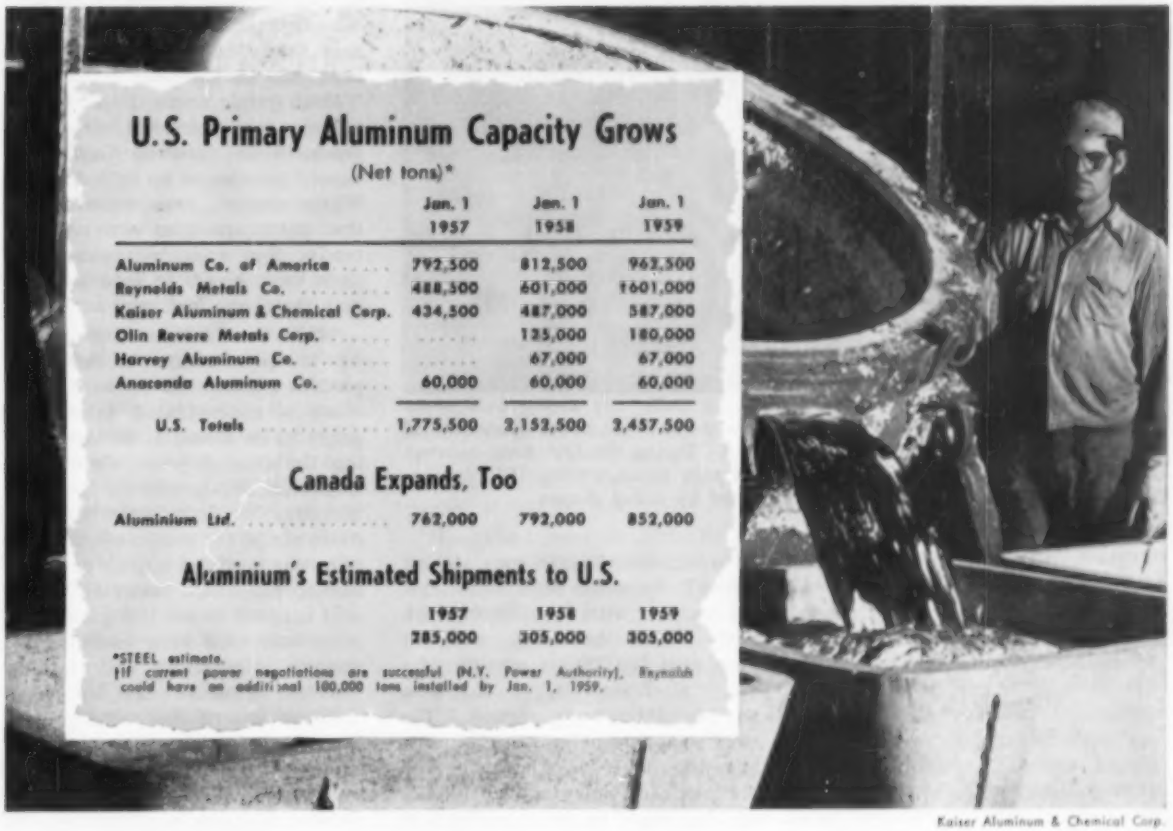


U.S. Primary Aluminum Capacity Grows

(Net tons)*

	Jan. 1 1957	Jan. 1 1958	Jan. 1 1959
Aluminum Co. of America	792,500	812,500	962,500
Reynolds Metals Co.	488,500	601,000	1601,000
Kaiser Aluminum & Chemical Corp.	434,500	487,000	587,000
Olin Revere Metals Corp.	.....	135,000	180,000
Harvey Aluminum Co.	.....	67,000	67,000
Anaconda Aluminum Co.	60,000	60,000	60,000
U.S. Totals	1,775,500	2,152,500	2,457,500

Canada Expands, Too

Aluminium Ltd.	762,000	792,000	852,000

Aluminium's Estimated Shipments to U.S.

1957	1958	1959
285,000	305,000	305,000

*STEEL estimate.
†If current power negotiations are successful (N.Y. Power Authority), Reynolds could have an additional 100,000 tons installed by Jan. 1, 1959.

Kaiser Aluminum & Chemical Corp.

Aluminum Secures Future

U.S., Canadian producers back up confidence with expansion dollars. Better supply will permit them to saturate existing markets and push new products

PRODUCERS are out to entrench aluminum's position as the second most used metal in the U.S. By 1975, its capacity (see cover) will be two and a half times current potential.

Year-end reports will show that some 1.68 million tons of the primary light metal were produced this year despite an August strike. It will be the fifth annual production record for aluminum in as many years. In 1955 about 1.57 million tons were produced.

Other Sources—Recovery of secondary aluminum from all sources (imported, domestic scrap, etc.) will total about 420,000 tons this year. Aluminium Ltd., independent Canadian producer, estimates that its shipments to the U.S. will be 257,000 tons in '56. Result: About 2,357,000 tons of aluminum available for domestic needs.

Wrought product shipments should reach 2.1 million tons in '56. Next year, predict industry observers, mill shipments will reach 2.3 million tons with 9.5 per cent of the total going for defense use. During 1955 total mill shipments were 2 million tons. The U.S. Bureau of the Census says that wrought product shipments showed a jump of 8.1 per cent in 1956 (first nine months, 1956 vs. first nine months, 1955).

In Balance—During the fourth quarter, supply caught up with demand. Reasons: 1. New capacity came in throughout the year. 2. The Office of Defense Mobilization discontinued taking the light metal for U.S. stockpile. This made an additional 650,000 tons available for industry. Stockpile outlook: ODM will not issue a stockpile call for aluminum during the first half of 1957.

Jitters—Aluminum salesmen developed a case of jitters during the fourth quarter as primary production began to exceed demand by 15 to 20 per cent. But others treated the temporary oversupply situation as though it were a good omen. I. W. Wilson, president, Aluminum Co. of America, reports:

Aluminum Co. of America

Flat-rolled products—sheets, plates and strip—account for better than half of the total wrought aluminum products shipped. During the first three quarters of this year, they gained about 10 per cent over corresponding 1955 figures. Extruded shapes are next in tonnage, followed by rolled shapes

"Instead of being plagued with the problems of attempting to meet demand, manufacturers should now be able to design and use aluminum in expanded applications with confidence that the supply will be adequate . . . we have not reached our peak. Aluminum consumption should exceed 3 million tons by 1960 and may go to at least 5 million tons by 1975."

The aluminum industry's confidence is backed with plans to increase 1956 primary capacity by more than 40 per cent. Building aluminum making facilities from the ground up—bauxite and alumina processing facilities, power genarating source and electrolytic smelter—costs from $1100 to $1500 per ton of new capacity. If the source of power calls for a new hydroelectric facility it costs about $1800 per ton from scratch.

Electricity — Aluminum producers will always switch to the cheapest source of power. At present, availability and competitive factors make coal the best bet. Thus, 72 per cent of all new smelting capacity will have coal for its basic power source. Water will account for 22 per cent; gas, 6 per cent. Look for the aluminum industry to be one of the first to convert to atomic energy when it becomes economically sound to do so.

1960—If market conditions are favorable, Kaiser Aluminum & Chemical Corp. plans to bring in an additional 95,000 tons during 1960-61. Reynolds Metals Co., now negotiating with the New York State Power Authority, will put up a new 100,000-ton smelting facility at Roosevelt, N. Y., if a power contract is signed. The smelter should be in operation during 1959 or 1960. Anaconda Aluminium Ltd. plans to push its Ca-Co., has made no announcement on expansion plans but could be a sleeper. Through its parent organization, Anaconda Aluminum has all the facilities it needs to become an integrated producer. Aluminium Ltd. plans to push its Canadian production over the 1-million-ton mark in 1960. And Olin Revere Metals Corp., which will supply 60,000 tons of aluminum to Revere Copper & Brass Inc. and 120,000 tons to Olin Mathieson Chemical Corp., could be undergoing an expansion by '60.

Producers will attempt to expand on capital generated from profits and by selling stock. But most will probably have to borrow money in the next two years. The problem will be to convince lenders that extra capacity will be needed if the industry is to promote aluminum for new applications by such large customers as auto and appliance makers.

Smelters — Secondary aluminum producers are expanding, too. "The use of smelters' casting alloys will increase markedly in the next five years," says Frederick Walker, vice president, American Smelting & Refining Co. AS&R has plans started to build a new 36,000-ton capacity plant to convert aluminum scrap into various grades of aluminum alloy ingot.

Most people think the aluminum industry has a drawer full of new products to announce now that supply has caught up with demand. While market researchers admit that there are some new products ready, they quickly explain that their basic aim is to saturate markets that have just been scratched.

1957—Construction will continue to be aluminum's most important market. Better supply will allow a concentrated sales campaign to be aimed at builders during the coming year. Says R. S. Reynolds Jr., president, Reynolds Metals: "We have only begun to move out of the period when aluminum was specified largely as a substitute for other materials. It is still unusual to see the qualities of aluminum used as a basic fact in modern engineering and design."

While windows are the most common use of the metal in construction, aluminum wall panels for multistory buildings should show substantial sales gains in '57. The federal highway program also will boost demand for aluminum for railings, signs and lighting standards.

Fabrication—Aluminum diecasting forecasts show the growth trend. The American Diecasting Institute estimates that 187,500 tons of aluminum (primary and secondary) were consumed in 1956. Next year some 225,000 tons will be used by aluminum diecasters, predicts the institute. And 1960 will see an estimated 375,000 tons used. It will mean improved business for many small businessmen, as 75 per cent of all aluminum diecasting is done by independent job shops.

Aircraft Dwindling?—Newer aluminum alloys can take speeds as great as 1400 mph, contend aluminum research men. This means that commercial, private and support type military aircraft will be able to use aluminum. Alcoa has backed its research findings by purchasing, without government help, a new 14,000-ton extrusion press. Cost: About $9 million. It will make ribbed wing sections,

wing spars, helicopter rotor blades and structural shapes up to 110 ft long, weighing up to 2500 lb.

Transportation — It will be the second most important market in 1957. The aircraft industry will take about 8 per cent of total mill shipments. Motordom will average over 40 lb on each 1957 model. "Availability of aluminum," says Kaiser Aluminum, "in adequate quantities is necessary for the adoption of new uses such as the integral diecast aluminum wheel and brake drum and the aluminum diecast engine block."

Some 65 per cent of all van-type trailers contain varying amounts of the lightweight metal. Railroads will continue to experiment with aluminum roofs for boxcars, aluminum trim for new passenger cars. Consumer durable goods and the electrical industry will be third and fourth in importance to the aluminum industry in '57. Foil will have another banner year.

Outlook: Supply will outstrip demand in '57, but growing acceptance could bring a close balance between supply and demand by 1958. Optimists contend aluminum will be in tight supply by '60.

Bendix-Sheffield Merger

Despite its recent merger with Bendix Aviation Corp., Detroit, Sheffield Corp., Dayton, O., will continue business as usual, says Louis Polk, Sheffield's president. Management of Sheffield will remain unchanged, with this exception: Mr. Polk now is a member of Bendix' board, a vice president and group executive and a member of the Bendix administration committee.

The boards of the two companies already have approved the merger plan in which all common shares of Sheffield stock will be exchanged for Bendix common of equivalent value. Sheffield preferred shares will be redeemed.

Mr. Polk says the merger was made to "equip our organization with the greatly expanded facilities, engineering, production, management and financial resources we must have to meet the largest projected growth opportunities in our history and to serve our present and potential customers more efficiently."

J&L To Buy Rotary Electric

Jones & Laughlin is getting into the stainless business faster than expected. It looks like smooth sailing for merger negotiations scheduled to be completed in April

CROSS another independent steelmaker off your list. Subject to approval by the stockholders of both companies by April, next year, Jones & Laughlin Steel Corp., Pittsburgh, will buy Rotary Electric Steel Co., Detroit.

It's a major move in J&L's long range plan to shift its product mix to lighter gages and alloy steels. Last year Rotary turned out about 10 per cent of this country's stainless steel, with an annual ingot capacity of 300,000 net tons.

New Customers — J&L, fourth largest steelmaker in the U.S. with an annual ingot capacity of 6,166,500 net tons, is a major producer of carbon steel products.

Its move into the stainless field has been indicated to the industry by the construction of two electric furnaces at Cleveland, which will add 400,000 net tons to its annual capacity. Instead of processing stainless there, however, all production and finishing will now be concentrated at Rotary's Detroit plant. The two new furnaces will produce carbon or alloy steel.

"We won't concentrate on auto customers for stainless because of Rotary's location," says a J&L sales official. "This merger will enable us to better serve old auto and appliance markets and new customers in the construction field."

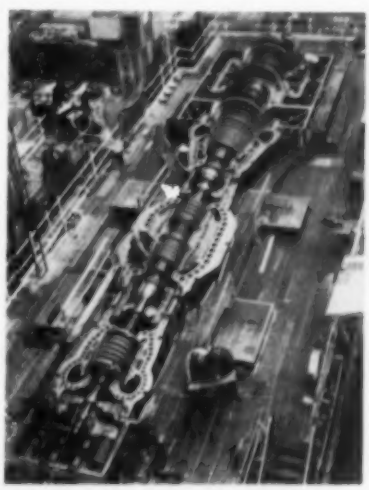
Smooth Sailing—Last week, no industry men voiced any expectation that the Justice department would act against the merger. Washington officials moved immediately at announcement of the proposed marriage of Bethlehem Steel Corp. and Youngstown Sheet & Tube Co. (STEEL, Dec. 24, p. 35).

Rumors of another sale of a steel company have been stopped: Control of Alan Wood Steel Co. has been placed in a ten-year voting trust, reports Harleston R. Wood, president.

Rotary's management line-up will continue to operate as before in Detroit, while J. A. W. Inglehart, chairman, will become a member of J&L's board.

Purchase price: Four shares of J&L for each five shares of Rotary.

Two new finishing mills for hot and cold-rolled stainless will be installed at Detroit as soon as the merger is completed in April, reports Martin K. Schnurr, Rotary's president.



GE Builds Steam Turbine

This automatic extraction steam turbine is being assembled at General Electric Co.'s Large Steam Turbine-Generator Department in Schenectady, N. Y. It will handle 2.8 million lb of steam an hour

Stamping Plant for GM?

General Motors Corp. may build a large stamping plant adjacent to its proposed Fisher Body and Chevrolet assembly plant at Lordstown, O., (near Youngstown), say GM engineers.

Dearborn Gage Expands

Elmer Ellstrom, president of Dearborn Gage Co., Dearborn, Mich., says the company will build a plant at Garden City, Mich. It will be ready by mid-spring, providing 15,000 sq ft of manufacturing space and 5000 sq ft of office space.

Portrait of Today's Executive

1—He experienced a happy home life in his early years.

2—He is extremely interested in and feels much attached to his family unit.

3—He has had an above average education. (Two-thirds are college graduates.)

4—He possesses superior mental ability.

5—He is an active participant in and leader of social organizations during childhood and throughout his career.

6—He is interested in religion as a force toward developing high moral and ethical standards.

7—He enjoys good health.

8—He is interested in people—particularly in selling them the idea of co-operation and promoting good human relationships.

9—He is serious and conscientious in his approach to work—actively seeks new work to be done and better methods of doing it.

10—He is objective in facing problems, frank and straightforward in dealing with people, spontaneous in his personal relationships.

11—He is ambitious and able to identify his ambitions with those of his company to an outstanding degree.

What Is a Manager?

In answering that question, a Chicago management consulting firm turns up characteristics that will help in selecting future executives for your company

IN MANAGEMENT development, place more emphasis on the selection of the personnel you're grooming for top executive posts.

Highlighting the basic importance of selection is a depth study of top-level executives conducted by George Fry & Associates, Chicago management consultants. The findings: There is notable consistency in the behavior and background of today's top executives.

Guides — Such characteristics (see check list) show significant deviation from those of people in general. "Because they are both identifiable and measurable, they provide bench marks not only for the selection of executives but also the identification of younger personnel with management potential," explain Roy A. Doty and Robert M. Wald who made the study.

"Obviously," says Dr. Doty, "no one characteristic can be classified as the most important in determining an individual's chance for success. But it must be remembered that management development programs have limitations in what they can accomplish.

"For example, an individual's basic mental ability can't be improved; but his capacity to use that ability more effectively can be developed. Candidates for management development programs should score high in mental ability —the typical executive we studied ranked in the 96th percentile of business and industrial workers."

People—Another trait in which the potential manager should rank highly—interest in people. A majority of the executives studied stated that skill in human relations was the most important factor in their own advancement. Such skill, point out the psychologists, is difficult to develop if the individual doesn't have this basic interest. Successful executives realize that business is basically people—not buildings, machines, technology.

"Initiative and strong identification with the company, mentioned often by the executives as advancement factors, can be developed to a certain degree through good company atmosphere as well as development programs," relates Dr. Wald. Executives said their job satisfaction comes not only from a sense of personal accomplishment but from the growth and development of the company as well.

Look Ahead—What'll the future executive be like? He'll be basically a co-ordinator of human effort —a professional manager, predicts Dr. Wald. Jobs and workers are becoming more specialized—to the extent that research men, engineers, marketing and finance specialists, are able to make their greatest contributions outside the general management field. Just as more and more Ph.D.'s are appearing in special fields, industry will have more executives highly trained in the art and science of pure management.

Object lesson of the survey: Management must depend more and more upon scientific methods of selecting potential managers it plans to develop (see page 41). "The shortcomings of purely subjective methods of selection have been pointed up clearly in studies we've made on foremen," Dr. Doty explains. "In several firms seeking solutions to foreman problems, we've found that their average foreman picked subjectively ranked in the 25th to 35th percentile in mental ability. Other studies show that successful foremen rank in the 50th percentile or better."

What To Do? — Recommended

for most effective selection are: Case history study of the individual; psychological tests for problem solving ability, personality traits and interest inventory; and a clinical-type interview. Average cost for these services: $100 per individual.

"Using this approach for selection," says Dr. Wald, "our psychologists have been able to predict executive competence on a pass-fail basis more than nine out of ten times."

Another factor stressed by the psychologists in picking your future managers: What will your company be like in the future? Are you in a stable, steady growth industry? Or is yours rapidly expanding in both size and scope of activities? The men in your training and management development programs will be running your company then. Make sure they're equipped to meet the challenge.

In the George Fry Survey . . .

Executives Met These Criteria

1—All were officers of their firm for at least three years.

2—Firms had to be at least five years old and have maintained over $5 million volume annually—many were in the over-$100-million category.

3—Executives had to be in a large measure responsible for planning and co-ordinating company policy.

4—Their salary for the past three years had to be $20,000 or more.

And ranked high in tests of

I.Q., Personality, Interests

(Mean percentile scores)

Intellectual ability	96
Personality	
Seriousness	58
Firmness	96
Tranquility	68
Frankness	78
Stability	62
Tolerance	66
Interests	
Mechanical	29
Computational	48
Scientific	40
Social Service	32
Clerical	34

By 1958: 20 Uranium Mills

Daily ore processing capacity to jump 50 per cent

	Tons of ore per day
Arizona	**250**
Rare Metals Corp., Tuba City	250
Colorado	**3960**
Atomic Fuels Extraction Co., Bedrock*	200
Climax Uranium Co., Grand Junction	350
Gunnison Mining Co., Gunnison*	200
Trace Elements Corp., Maybell*	300
Union Carbide Nuclear Co., Rifle	280
Union Carbide Nuclear Co., Rifle*	1000**
Union Carbide Nuclear Co., Uravan	850
Vanadium Corp. of America, Durango	430
Vanadium Corp. of America, Naturita	350
New Mexico	**3500**
Anaconda Co., Bluewater	3000
Kerr-McGee Oil Industries Inc., Shiprock	500
South Dakota	**300**
Mines Development Inc., Edgemont	300
Utah	**3425**
Atomic Energy Commission, Monticello	600
Texas Zinc Minerals Co., Mexican Hat*	775
Uranium Reduction Co., Moab	1500
Vitro Uranium Co., Salt Lake City	550
Washington	**400**
Dawn Mining Co., Ford*	400
Wyoming	**1150**
Lost Creek Oil & Uranium Co., Split Rock*	400
Lucky Mc Uranium Corp., Fremont county*	750
Total U.S.	**12,985**

*To be completed in 1957 or early 1958.
**Including ore fed to concentrating plants.
Source: Atomic Energy Commission.

IN 1956, the U.S. produced 6000 tons of uranium concentrate and mined 3 million tons of ore. The concentrate came from 12 uranium mills with the capacity to handle almost 9000 tons of ore a day. Now handling capacity will be boosted to about 13,000 tons a day when eight new mills are completed.

Reserves—Domestic ore reserves are estimated at 60 million tons, with over 68 per cent of them located in New Mexico. Utah ranks second in potential with over 12 per cent of the reserves. Colorado, Arizona, Wyoming and Washington follow in that order. Less than 2 per cent of U.S. reserves lay outside those six states.

Vacuum Melting Catches On

The trend is to larger furnaces. Sales of vacuum melted products have doubled in a year, may go to $150 million by 1966. Big uses are in aircraft and electronics

EXPANDING demand for new alloys, plus metals and alloys free from impurities, is bringing vacuum melting fast recognition as an important metalworking tool.

Sales of induction melted vacuum alloys (the older of the two methods of vacuum melting) this year are estimated at about $10 million (not including titanium). That's twice last year's volume. Sales of $16 million to $22 million are expected in 1957. By 1966, they may reach $100 million to $150 million.

Sales of alloys melted by the fast growing consumable electrode process (the newer vacuum melting technique) are expected to at least equal the mark set by induction melted alloys next year.

Getting Bigger—Significant in this uptrend and the development of technology is the increasing size of furnaces. Two or three years ago a furnace with a capacity of 500 lb was outstanding. Now 1000-lb units are common, and much larger ones are getting into operation.

NRC Equipment Corp., Newton, Mass., is building six vacuum furnaces with 2000 lb of capacity and one that is even larger. Vacuum Metals Corp., Syracuse, N. Y., has a 3000-lb unit in operation, and furnaces capable of turning out 10,000-lb heats appear to be not too far off.

Question — Where are vacuum melted products going? One industry leader answers: 1. Aircraft, rockets and guided missiles. 2. Electronics. 3. Tool steels and "high strength alloys." In the future, he believes, use in the final category will surpass electronic demands. Vacuum melted alloys, he explains, give promise of considerable improvement in traverse ductility, a major consideration in high strength uses.

Another expert sizes it up this way: "Three major fields—aircraft and missiles, nuclear applications, and products which require an extremely precise finish." Also, he points out: "There is considerable interest in vacuum investment casting, in reactive metals (such as titanium and zirconium) and in arc melting of high melting point metals—molybdenum and columbium."

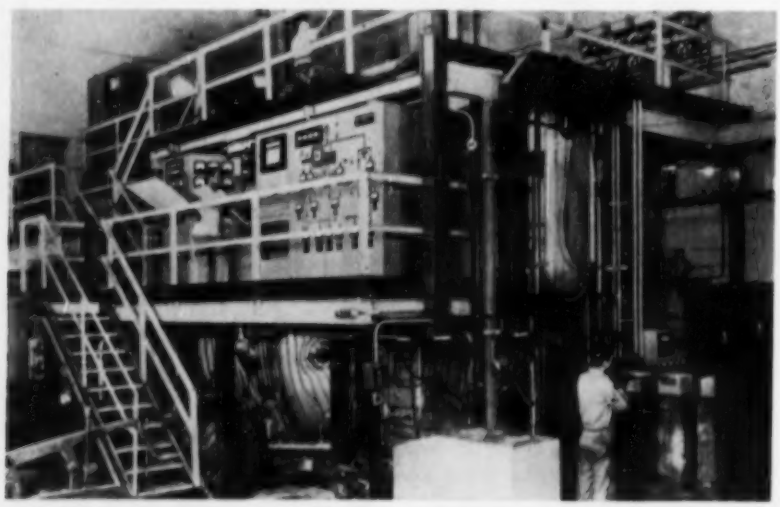
Utica Drop Forge & Tool believes that the chief markets for vacuum induction melted products are jet engine uses which involve high temperature superalloys of the nickel precipitation-hardening type. Primary uses: Forged turbine buckets and, in some instances, precision cast compressor blades and turbine buckets.

More Uses—Utica notes a growing interest in vacuum induction melted master heats for remelting by investment casting shops. High temperature alloys (in the form of sheets) for structural members of jet engines are drawing attention. Interest is also noted in vacuum induction melted steel—both the stainless and low alloy types.

Haynes Stellite points out that vacuum melting has recently gained increased importance for the production of high temperature alloys containing aluminum and titanium. The method is especially effective in producing precipitation-hardening alloys, where aluminum and titanium, both readily oxidized metals, are used as important alloying elements.

Two Types — Furnaces used in vacuum melting are heated electrically by induction or direct arc. Induction furnaces are primarily used with the higher alloys. Arc furnaces were first used in the treatment of titanium. The remelting of steel alloys followed.

The Line-Up—Major commercial producers of vacuum melted wrought alloys include Allegheny Ludlum Steel Corp., Pittsburgh; Metallurgical Products Department, General Electric Co., Detroit; Haynes Stellite Co., a division of Union Carbide & Carbon Corp., Kokomo, Ind.; Universal-Cyclops Steel Corp., Bridgetown, Pa.; Utica Drop Forge & Tool Division, Kelsey-Hayes Wheel Co., Utica, N. Y.; Vacuum Metals Corp., Syracuse, N. Y., (owned by Crucible Steel Co. of America); and Vanadium-Alloys Steel Co., Latrobe, Pa.



NRC Equipment Corp. built this vacuum induction unit, says it's world's largest

Fabricator Builds

City Iron Works Inc., Hartford, Conn., will build a $200,000 plant at Wethersfield, Conn., which will employ 100. It will be in operation about mid-1957.

What's New in Equipment Replacement and Depreciation Policies?

A survey of capital goods manufacturers shows:

1. Fifty-four per cent give an individual or staff the special responsibility of studying the economics of re-equipment.
2. Twenty-six per cent make up a preliminary capital budget for more than one year ahead.
3. Fifty-nine per cent know of many unused opportunities for profitable re-equipment in their customers' plants.
4. Forty-five per cent make equipment analysis studies for customers.
5. "The shift to the new methods of depreciation is remarkable."

Source: Machinery & Allied Products Institute.

Better Methods for Profits

Pick and shovel studies help metalworking firms evaluate their equipment needs and properly depreciate purchases. Equipment formulas are catching on

ALMOST a decade has passed since the Machinery & Allied Products Institute surveyed the replacement and depreciation policies of capital goods industries. A new survey shows "the beginning of a revolution in what was a backward area of management," concludes MAPI.

In 1948, the typical company surveyed had no regular procedure for reappraising the remaining life of equipment and revising its depreciation rates accordingly; did not tie depreciation rates to variations in use; did not earmark accruals for the purchase of new equipment.

Revolution—Today, 54 per cent of the companies make someone responsible for the preparation of studies to determine the economic advantage of re-equipment, and 79 per cent make a regular review of their equipment situation.

Twelve per cent tie depreciation charges to variations in the rate of use of their equipment.

Thirty-four per cent now earmark a portion of depreciation accruals for the purchase of new equipment.

Still there's little reason to do handsprings, says MAPI. There's plenty of room for improvement in depreciation policies because industry annually overestimates its profits by $4 billion to $5 billion (STEEL, Nov. 19, p. 99).

A Closer Look—Some of the contributing causes are turned up by this MAPI survey. Only 26 per cent of the 300 companies surveyed make up preliminary capital budgets for more than one year in advance. Of those that do, almost half only look ahead two years.

That matter of keeping records on equipment is overlooked, too. While 73 per cent keep records of maintenance and repairs, only 38 per cent check on number of machine hours works; 23 per cent record spoilage; 26 per cent know the amount of down time.

Customers, Too — MAPI notes that capital goods producers are good customers of each other, so survey questions concerning customers shed a second light on the situation: 1. Salesmen of 59 per cent of the respondents know of many unused opportunities for profitable re-equipment in customers' plants. 2. Only 45 per cent make equipment analyses of customers' needs. 3. A whopping 86 per cent find that their larger customers have more scientific equipment policies than smaller customers.

With too little solid knowledge of the condition of present equipment and of new equipment needs, it follows that manufacturers don't use the latest depreciation helps as much as they might.

New Aids—Only 3 per cent of the survey respondents adjust their book depreciation accounts to compensate for inflation since the equipment was purchased. This cost-of-living index for machines can't be carried over to tax accounts because of present tax laws, but it would give business a more realistic account of profits, say the experts.

Best signs of improvement in depreciation policies, says MAPI: The shift to new methods of depreciation (double declining balance and sum of the digits) has been accomplished by two-thirds of the respondents; 60 per cent are using replacement formulas to guide re-equipment policies, rather than rule-of-thumb methods.

Freight Car Deliveries Up

Independent freight car builders have order backlogs of 55,000 cars, compared with 69,263 cars a year ago, reports American Railway Car Institute. Railroad shops have over 60,000 cars on order. Deliveries of new cars totaled 6695 in November, compared with 5666 in October and 3427 in November, 1955. The November, 1956, figure is the highest since October, 1953.

Production Boost for Jet Parts

A $500,000 addition at King Fifth Wheel Co., Wilkes-Barre, Pa., will increase production of jet aircraft rings 50 per cent.

Atomic Power Plants: Who'll Develop Them?

ATOMIC ENERGY will provide one of the livelier topics in Congress in the coming year. Proponents of big federal power programs last year proposed a bill that would put up $400 million for government-owned nuclear power stations. Then the action began. Chairman Lewis Strauss of the Atomic Energy Commission led the fight that defeated the measure, despite backing it received from some other higherups in the AEC. Expect about the same pattern to be followed this year, with a few changes.

Mr. Strauss's New Atomic Power Plans

Chairman Strauss, for example, is preparing an eight-part recommendation which calls for government action to build three types of power reactors if industry does not present suitable proposals to erect them. That was one of the reasons backers of the $400-million bill of last year gave to justify it—that private industry wasn't moving ahead fast enough in the atomic power field. Chairman Strauss also wants increased government aid for civilian research and development. He thinks that would be sufficient to step up the pace of civilian progress. In other words, it looks like this: the atomic energy chairman still wants private industry to carry the ball as far as possible but is opening the door for government action just in case.

More AEC Information Declassified

In line with getting more private firms to do more in atomic energy, more AEC information in being declassified. Some 30,000 reports were examined this year and one-third of them declassified. Plans call for examination of another 20,000-plus to be studied as soon as possible. Much information dealing with civilian power reactors will be declassified, plus metallurgical information of fuel fabrication and data on final stages of zirconium-hafnium separation. Also wanted by Chairman Strauss is quick congressional action on atomic plant insurance. Action was begun on this last year but didn't pass.

18 Civilian Plants by 1962

Progress report: The nation's first big atomic power plant at Shippingport, Pa., will get into operation in 1957. It will furnish the Pittsburgh area with 65,000 kw at first, later 100,000 kw. Including that one, at least 18 civilian nuclear power plants are in various stages of discussion or negotiation in this country. They'll come into operation by 1962. Investment will be over $650 million—much of it supplied by private industry.

Defense Inventory Begins

The Defense department is beginning an inventory of the maintenance facilities that it can count on to keep weapons in service during wartime. A report is due next September. At that time the question will be taken up on what, if any, government assistance will be given private industry to expand or maintain maintenance facilities that could be called on in wartime.

Check Before Jan. 15

Present and potential defense contractors should check before Jan. 15 with their local procurement planning officers to make sure of up-to-date listings in the register of planned mobilization producers. Firms listed in the register often get preference in contract awards when similar bids are received.

Meet Ralph M. Allison: He's director of the General Components Division, Business & Defense Services Administration. Mr. Allison was president and general manager of Borg-Warner's Warner Automotive Parts Division, Auburn, Ind., until his retirement in February. He still serves B-W as a consultant and is a director and vice president of Portland Forge Co., Portland, Ind. He can be contacted in Washington at Commerce department, room 4128. Phone Sterling 3-9200, Ext. 3155.

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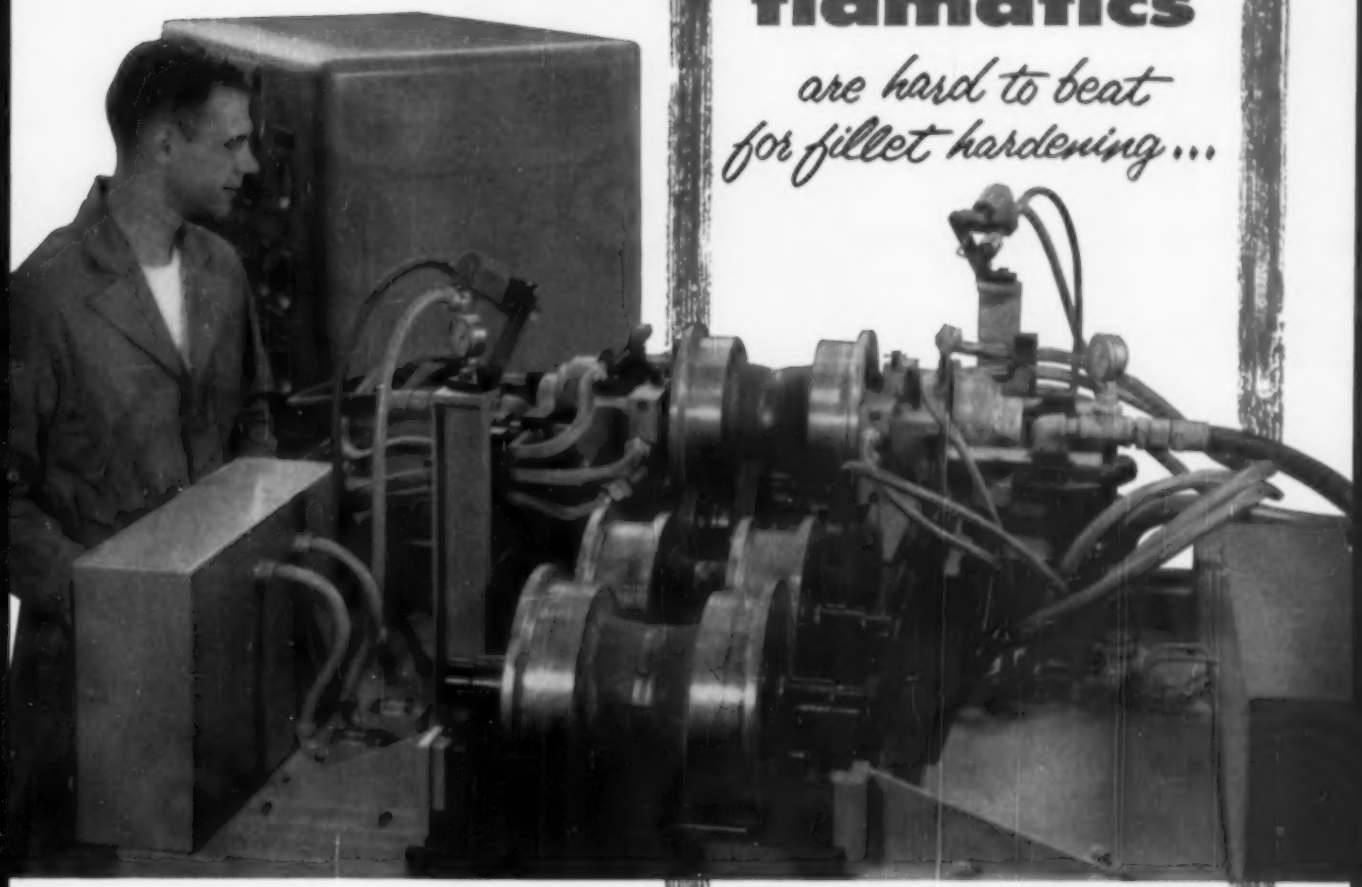

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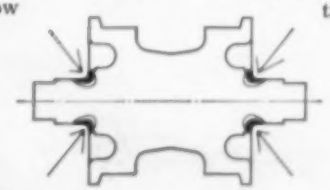
Above you see a new, fully automated Cincinnati® Flamatic being used to increase strength and fatigue resistance of the axle fillet sections of 120 lb., SAE 1045 steel track rollers for crawler-type vehicles. Here's how it operates in the plant of a major manufacturer of heavy construction equipment:

Track rollers are delivered, one at a time, from the loading rack to the heating station. As the flame heads "scissor in," the part is rotated rapidly and an oxy-propane flame is applied to both axle fillet sections for 64 seconds . . . immediately followed by a 24-second spray quench. The part is then released to roll down the discharge trackway, while the next part is received in the fixture.



The operator is required only to initiate the cycle, which will continue automatically, as long as parts are on the receiving conveyor.

A case, ¼" thick, hardened to Rc 55-53, is produced around the periphery of the fillet sections, with a wide transition zone behind it. (See part sketch.) Production is 38 parts per hour.

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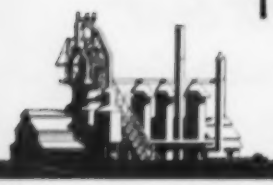

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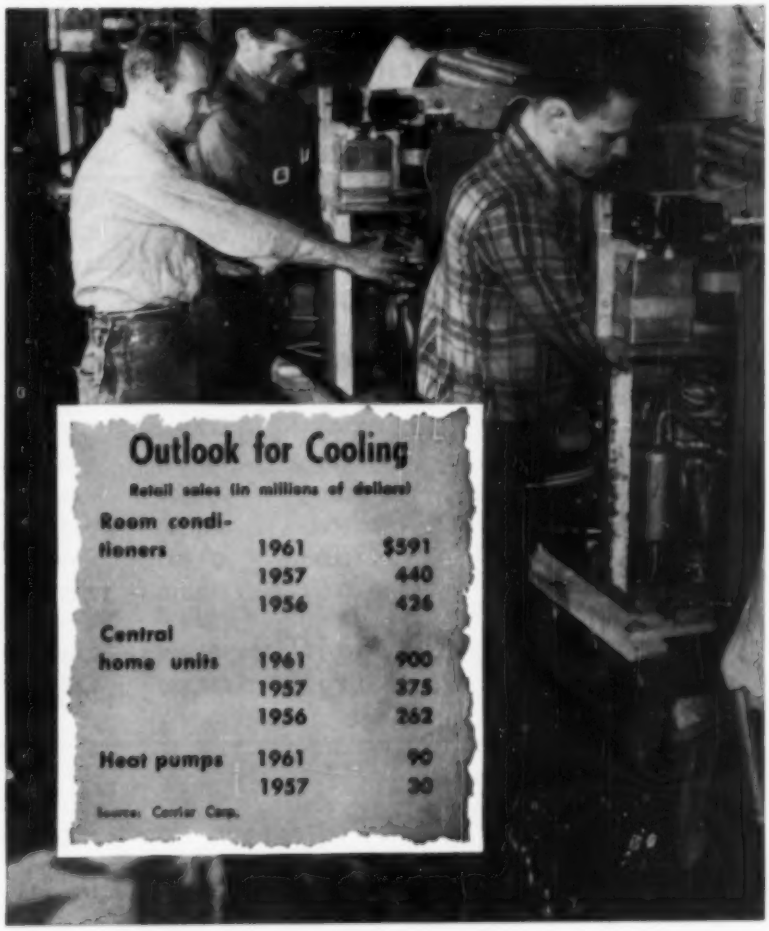
Canada: Arthur G. McKee & Company of Canada, Ltd., 372 Bay St., Toronto



Cooling Sales Get Hot

1957 is expected to break all sales records for the eighth consecutive year. Keener competition is predicted. By 1961 retail sales will hit the $5-billion level

HOME, commercial and industrial uses of air conditioning are continuing upward. Cloud Wampler, chairman of Carrier Corp., Syracuse, N. Y., estimates 1956 retail sales at $3.2 billion. In 1957, he predicts, sales will total $3.5 billion.

Keener competition and a sales boost of 15 per cent for 1957 are predicted by D. C. Minard, president of Trane Co., La Crosse, Wis. He bases his forecast in part on continued high levels in construction activity.

Competition—Mr. Wampler says the number of brands of room air conditioners has been halved in about a year without decreasing competition. The competition, Mr. Wampler continues, is that of "able and experienced concerns, where intelligence, hard work and high quality can pay off in sales and profits." He expects Carrier's production of room units in 1957 to double that of this year. The field of room air conditioners, he says, is entering a period of large-volume acceptance where selling "has become more predictable and a stable pattern is beginning to emerge."

Sales predicted for room units in 1957 range from 1,600,000 to 1,750,000 units.

More Competition—Mr. Minard says competition is responsible for the growth of the air conditioning industry. "Stores must air condition to make their customers comfortable. Competition demands fair working conditions so employees can be efficient. Owners of large buildings air condition to be competitive in attracting tenants."

The American Institute of Management estimates that air conditioning becomes a competitive necessity when 15 per cent of the desirable office space in a city has been comfort cooled. Mr. Minard comments: "Virtually every major office building erected during 1956 included air conditioning."

The air conditioning of existing office buildings—the largest source of "big" orders—hit a new high during 1956, says Carrier. In a number of cities the market is just beginning to open up wide.

Air conditioning of industrial plants for greater employee efficiency has shown a "spectacular climb," says Mr. Wampler. Carrier's orders for this type of installation increased 255 per cent in a year.

Sales Booster—"Automation is one of air conditioning's best friends," says Mr. Wampler. Reason: Automatic production equipment using electronic devices produce great quantities of heat and need temperature control to function properly.

The residential market is certain to attract attention in 1957. Mr. Minard says: "Less than 1 per cent of the country's 35 million homes have central air conditioning."

Heat Pumps—An estimated 9000 installations are expected to be more than doubled by the end of next year. Production is expected to hit 30,000 units by 1961.

Heat pumps heat or cool as needed. So far they have been most practical in those parts of the country where electrical rates are low and winters are not severe.

FOREIGN OUTLOOK FOR 1957

Last in series

Trends in World Steel Production

	Net tons produced		
	1956‡	1951	Net tons gain
West Germany	25,700,000	14,856,600	10,843,400
Great Britain	23,000,000	17,515,120	5,484,880
France	14,700,000	10,818,500	3,881,500
Belgium	7,000,000	5,577,000	1,423,000
Italy	6,500,000	3,307,590	3,192,410
Luxembourg	3,800,000	3,384,700	415,300
Saar*	3,700,000	2,863,300	836,700
Sweden	2,430,000	1,677,500	752,500
Austria	2,180,000	1,130,580	1,049,420
Spain	1,340,000	900,020	439,980
The Netherlands	1,160,000	608,300	651,700
Yugoslavia	990,000	473,000	417,000
Free Europe Total	92,500,000	63,112,210	29,387,790
U.S.	115,000,000	105,199,848	9,800,152
Canada	5,250,000	3,568,770	1,681,230

*To return to West Germany Jan. 1, 1957.
**Countries producing less than 500,000 tons annually.
‡Estimated.

Steel Leads the Way

Gains in production in the last five years chart the paths of future economic growth. Gains in underdeveloped areas and Russia must be watched

IF WORLD steel production can be regarded as an important key to world economics, then the U.S. has little reason for complacency about its position in relation to Russian dominated areas.

Of the 10 nations with the largest gains in steel production since 1951 (see table), four are Iron Curtain countries.

Twice the Gain—More important, the U.S., the acknowledged leader of the free world, ranks third in the list of expanders, its steel output increase being only half the size of the Soviet Union's. West Germany captured second place by increasing its output 10.8 million tons, compared with the U.S.'s 9.8 million.

The fall off in U.S. production came, of course, because of the steel strike. If that had not occured, the U.S. would probably have showed a gain of 22 million tons.

Russia's gain of 19.1 million tons is almost as much as the combined gains of the U.S. and West Germany.

Great Britain hiked its output by 5.5 million tons to rank fourth. The other six nations follow in this order: Japan, 4.5 million; China, 3.9 million; France, 3.9 million; Italy, 3.2 million; Poland, 2.3 million; Czechoslovakia, 1.9 million.

World Areas—If you have an interest in geopolitics, note the expansion that took place in the Far East. China, Japan and India together boosted their production by more than 8.7 million tons. Add Australia and you have an increase of almost 10 million tons, more than the U.S.'s increase and just 2 million tons shy of the total increase of the Western Hemisphere.

Add the Soviet's new steel production (much of the capacity is probably located in Siberia), and you find that relatively underdeveloped Asia increased its output by about 30 million tons, which is equal to the gains of Free Europe.

Fifty years from now, when communism may be much less of a world force, the Far East as a producing area promises to challenge the Western Hemisphere and Europe as they have never been challenged before. Nationalist movements in the Far East (and some consider Chinese communism essentially nationalistic in character), count on their ability to make steel as basic to growth plans.

Europe's Gains—In Free Europe, West Germany, Italy, Austria and The Netherlands showed the most pronounced gains percentagewise. Both Italy and Austria almost doubled their production in the five-year period, while The Nether-

	1956‡	1951	Net tons gain
Brazil	1,360,000	927,300	432,700
Mexico	605,000	498,410	106,590
Western Hemisphere Total	122,215,000	110,194,328	12,020,672
Japan	11,700,000	7,151,980	4,548,020
Australia	2,780,000	1,649,870	1,130,130
India	1,940,000	1,679,660	260,340
South Africa	1,710,000	1,045,070	664,930
Free World Total	232,845,000	184,833,118	48,011,882
U.S.S.R.	53,700,000	34,540,000	19,160,000
Czechoslovakia	5,500,000	3,643,200	1,856,800
Poland	5,360,000	3,071,200	2,288,800
China	4,900,000	990,000	3,910,000
East Germany	3,200,000	1,707,200	1,492,800
Hungary	1,850,000	1,357,400	492,600
Rumania	880,000	710,600	169,400
Iron Curtain Total	75,390,000	46,019,600	29,370,400
Other countries**	1,813,000	1,326,820	486,180
World Total	310,048,000	232,179,538	77,868,462

lands did a little better than that.

The biggest economic story of the century: West Germany's rebound from World War II. In five years it increased its steel output by more than 70 per cent.

Yugoslavia almost doubled its production, but it can't be counted absolutely as Free European steel output.

A Certainty—West Germany's domination of the Free European economic scene becomes more likely (or apparent — choose your term) every day. With the return of the Saar to the Bonn government Jan. 1, 1957, its total steel output will be at least 30 million tons. Expansion plans by German steel leaders indicate production by 1960 may be almost equal to that of Great Britain and France combined.

West Germany's state of economic health is excellent, compared to the tendency in the rest of Europe to reach the limits of material and manpower capacity. Its foreign exchange situation is without doubt the best in Europe.

Some statesmen and economists are regarding the reunification of Germany as likely to occur sooner than many expect. Russia's recent experience in Poland and Hungary may force her to withdraw from East Germany to shorten her lines. Satellite troops can no longer be counted as loyal to the Soviet, East German troops perhaps less than the others because of the desire of almost all German people for reunification.

Add East Germany's steel production in 1956 to that of West Germany and the Saar: 32.6 million tons. East Germany added about 1.5 million tons to its output in the last five years; expansion would probably speed up under a free government.

Economic Union — That's just one of the reasons for Britain's growing interest in economic union with Europe. Germany is Britain's chief competitor. If Britain stays out of the European Community for Coal and Steel (made up of Germany, Italy, France and Benelux), German domination of the common market may be disastrous for Britain's export business, her chief strength.

Now the two major British political parties and two leading business groups, Federation of British Industries and Association of British Chambers of Commerce have given at least qualified support to the project.

The community has also been strengthened this year by the signing of a treaty of consultation with Switzerland. Trade measures to be taken by Switzerland or the community will be discussed before being finalized by either party.

The Atom—European union in the form of co-operative nuclear energy development (Euratom) took another step forward this year when Germany agreed to grant Euratom's executive authority the right to exercise a "modified monopoly" over the supply of fissionable material.

In Britain alone, it is estimated that within ten years commercial atomic power will save 6 million tons of coal, and by 1975, from 40 to 70 million tons. The necessity to import coal from the U.S. and the resultant drain on dollar resources remains one of Europe's biggest problems.

Suez Crisis—With the flow of oil and dollars from the U.S. to Europe certain to increase in future months, Europe is generally feeling better about the Suez business.

It will be the toughest winter on record since World War II in many ways, however. How Europe will do in 1957 depends a great deal on whether any workable solution to Egypt's control of Suez comes out of the present negotiations.

Outlook — The edge is off the world boom. In most countries inflationary trends are being watched closely: Tight money is practically a world-wide phenomenon. At the same time, workers from Tokyo to Berlin are demanding more buying power per production hour as they become more aware of the material happiness offered by higher standards of living. We may reasonably expect a further slowdown, while technology (in the form of cheap atomic power and more extensive automation) strives to catch up with demand.

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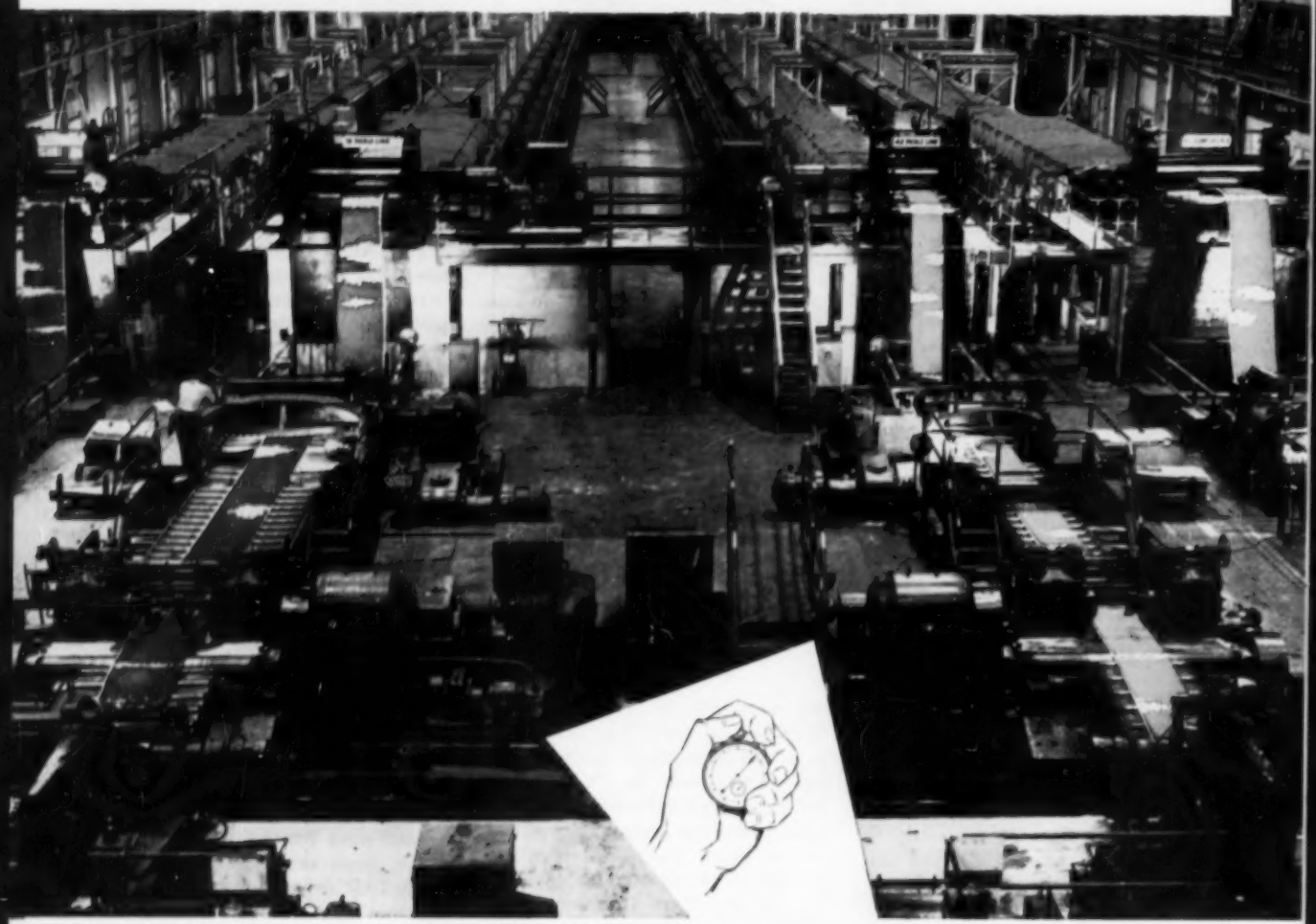
‡ *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

From Wean Pickling Lines



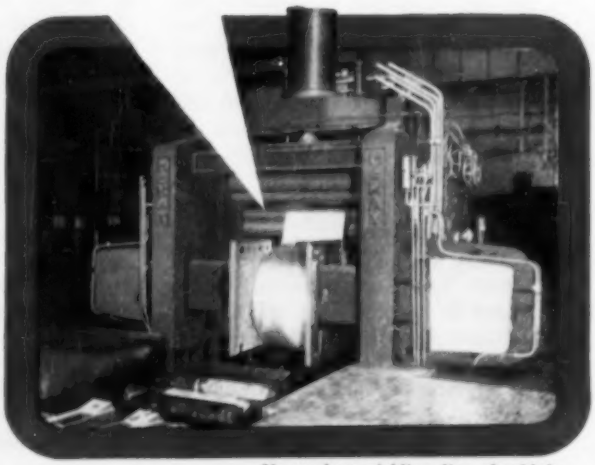
Four high production Wean Pickling Lines at work in one of the nation's largest mills.

....the finest product at record speeds

Wean Pickling Lines are setting production records wherever they are installed. BUT, more important to steel producers is the excellence of pickled product these lines are turning out—even at their fastest speeds.

Part of the story is the double breaker processing uncoiler, right, that properly prepares the strip for rapid and uniform pickling at high speeds. Wean lines are engineered to give producers installations which provide the ultimate in automation and high speed operation.

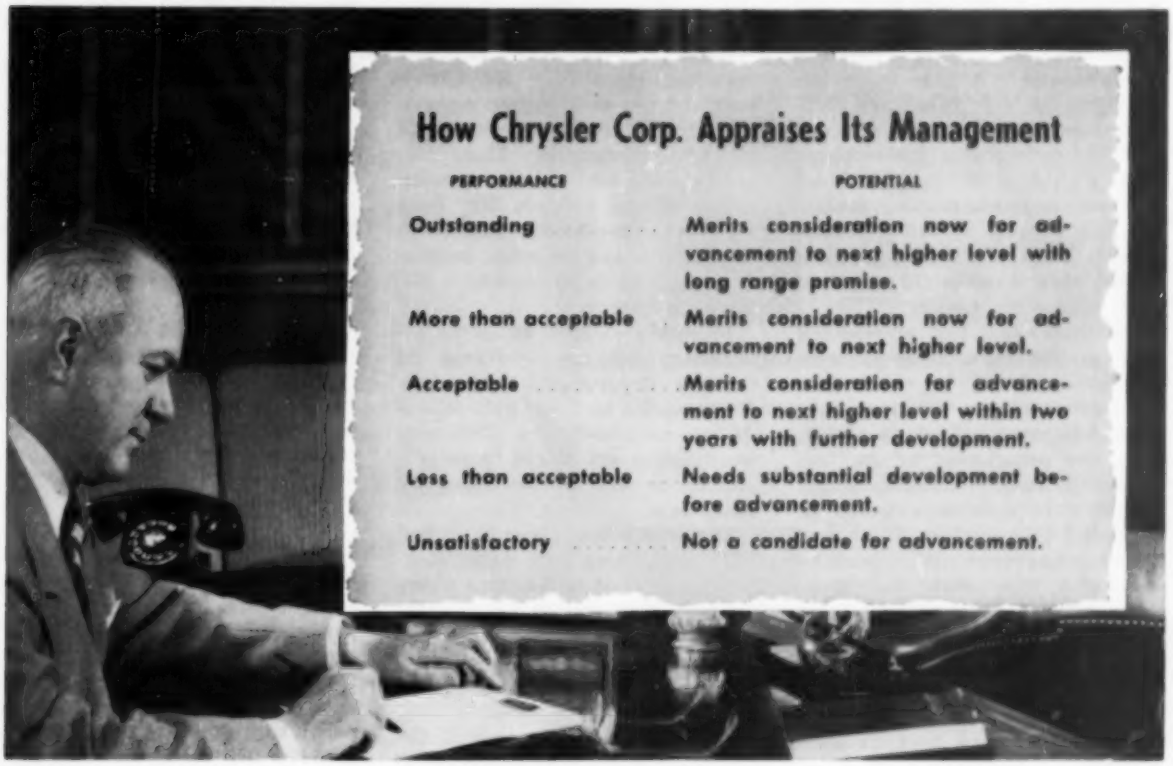
When next you're in the market for pickling equipment be certain to see a Wean line in operation. We're sure you'll be convinced Wean engineered lines are what you need.



No modern pickling line should be without a McKay Processing Uncoiler to prepare the strip for high speed pickling.

10286

The WEAN ENGINEERING CO., INC. WARREN, OHIO


How Chrysler Corp. Appraises Its Management
PERFORMANCE
POTENTIAL
Outstanding
Merits consideration now for advancement to next higher level with long range promise.
More than acceptable
Merits consideration now for advancement to next higher level.
Acceptable
Merits consideration for advancement to next higher level within two years with further development.
Less than acceptable
Needs substantial development before advancement.
Unsatisfactory
Not a candidate for advancement.

Its appraisal system looks to the future as . . .

Chrysler Develops Manpower

FRANK GORDON is head of one of Chrysler Corp.'s stamping divisions. A year ago he was a tool stores foreman. It looked like he'd never advance because Mr. Gordon stuttered. His chance for promotion came through the work of Chrysler's management development group.

In evaluating job abilities of all stamping plant supervisors from foreman on up, an appraisal coordinator found that Mr. Gordon was outstanding in his work and possessed long range potential for a much higher position. These qualities had been overlooked because of his speech defect.

The tool stores foreman and his boss discussed the problem. Mr. Gordon realized his stuttering stood between him and advancement. He decided to take corrective speech courses. Results: Rapid promotion for Mr. Gordon, better use of a management man for Chrysler.

Protect Innocent—Mr. Gordon's name has been changed and some of the details of his case slightly altered, but his situation points up the dual benefits of management development. Wayne E. Grimm, director of management development for Chrysler, puts it this way: "We don't develop anybody; people develop themselves. All we do is set the stage by pointing out strengths and weaknesses in a departmental or divisional supervisory setup."

Chrysler has had management counseling plans for 24 years. Mr. Grimm started his department two years ago. To date, some 14,000 persons in supervisory positions have been evaluated, most of them for a second time. The aim is to appraise each supervisor once a year. "We check everyone in all departments and divisions, from foremen up to elected corporate officials," he says.

Takes Time—It will be another three years before the value of the program can be fully assessed, but the evaluations already have had much to do with a selection and promotion policy Chrysler adopted a few months ago.

Thomas Jaeger, supervisor of program co-ordination, reveals another example. "When we got around to checking the electrical departments, we found that many top supervisors had learned their trade when radio tubes were a gleam in DeForest's eye. The ap-

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prentices knew more about electronics than the bosses did." Action was taken. Supervisors went back to Chrysler's industrial education department for refresher courses in electronics.

Objectives — "These are incidental benefits. In time, our appraisals will provide the corporation with another practical tool for long range manpower planning. We may even be able to determine exactly what kinds of experience a man must have to fill a certain job," claims Mr. Grimm.

He thinks that further research can predict how many college graduates should be taken into management ranks in a given year, even how many should be taken into one department or another.

Co-ordinators — Success of the program rests with a group of appraisal co-ordinators. These men assist supervisors in appraising managers who work for them. They also set up inventory charts for each department and division to show department heads where management strengths and weaknesses are.

"We evaluate a man in relationship to how well he does his job, not in relationship to another man in a similar position," says Mr. Jaeger. Co-ordinators try to get the same types of evaluations in all divisions. "Acceptable work has to mean the same thing to supervisors in one division as in another or the plan doesn't work," he explains.

Process—Here's how the appraisal system operates: Each department is handled separately. Appraisals start from the lowest management ranks and work up. Take the hypothetical case of Walter T. Door, foreman in a finishing department.

The co-ordinator meets with Mr. Door's boss to evaluate job performance. Using a check sheet, the co-ordinator gives a numerical value to each aspect of Mr. Door's job. Ratings range from one (unsatisfactory) to five (exceptional). The boss is carefully quizzed as to just what he means when he says: "Walter does a good job of enforcing safety in his section."

Potential — Job performance is given an over-all rating. Then the boss and co-ordinator fill out a second form which sums up the foreman's job potential (see page 41). This takes into account Mr. Door's job performance, education, age and other character traits.

Description and potential forms are countersigned by Mr. Door's boss and the next higher supervisor to show that they agree with the total evaluation. These records provide the basis for a counseling session between Mr. Door and his boss. Strong points are emphasized and specific suggestions offered in areas where Mr. Door can improve.

Inventory — Meanwhile, the co-ordinator has been working up through department supervisors. He compiles all appraisals into a departmental inventory. This summary points out where there is a scarcity or an overcrowding of top notch men.

Men with potential can be shifted from jobs where they might stagnate and placed in positions where their abilities will be better utilized. Managers who don't measure up in one job can be moved sideways into slots where they will have a chance to improve.

Acceptance — "A survey of the appraisal program shows about 98 per cent of the men approve of the system. The other 2 per cent can be traced back to poorly handled interviews," says Mr. Jaeger. Chrysler feels the appraisals are helpful in spotting good and unsatisfactory men among thousands of supervisors.

U.S. Auto Output

Passenger Only

	1956	1955
January	611,190	659,508
February	554,667	675,495
March	575,559	794,015
April	547,766	753,851
May	471,994	724,892
June	430,141	649,393
July	448,804	659,763
August	401,997	614,493
September	190,709	461,591
October	388,922	517,813
November	581,088†	749,061
11 Mo. Total	5,202,837†	7,259,875
December		682,257
Total		7,942,132

Week Ended	1956	1955
Nov. 24	118,949	151,799
Dec. 1	159,976	177,712
Dec. 8	167,576	178,409
Dec. 15	158,431	169,256
Dec. 22	154,388†	150,881
Dec. 29	95,000*	105,670

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

Zinc Near Peak?

Zinc diecasting for automotive use appears to be at or near its peak unless base metal costs are lowered, says Maurice Garwood, chief engineer, materials, Chrysler Corp., Detroit.

Mr. Garwood adds that his opinion is based on the knowledge that use of zinc diecastings depends largely on styling needs. "Even so, I believe further increase in zinc application is substantially retarded by today's base metal price, and the use of the metal will decline if these prices are not drastically lowered," he continues.

Peak Year? — The use of zinc diecastings is up about 8 per cent on 1957 cars, according to John L. Kimberley, executive vice president, American Zinc Institute. He says the average 1957 car will have more than 65 lb of zinc, compared with 60 lb in 1956.

Aside from zinc, Mr. Garwood sees increasing use of other castings on future automobiles. His rundown points out places where castings may be used.

Pearlitic — "We anticipate pearlitic malleable foundrymen will provide a better way to produce castings with more hardenability. One of the new applications we are thinking about is transmission gears. Other applications promise to be output flanges for transmissions and rear axles, wheel hubs and possibly connecting rods," he declares.

Another auto company has pearlitic connecting rods operating in a test engine. One engineer says cast rods probably will be 15 to 20 per cent cheaper. He adds that performance tests indicate there are still casting problems to lick before pearlitic malleable will be accepted as a rod material.

Lightweights — Developments in hot chamber diecasting have made magnesium a candidate for clutch and converter housings, transmission extensions, wheels and fans. Mr. Garwood reports cast magnesium already has replaced steel stamped window regulators on Chrysler cars.

ONE OF A SERIES . . .

What makes a cylindrical roller bearing good?

The RIGHT ROLLER DESIGN and QUALITY CONTROL

The design and quality of the *rollers* play a large part in the performance of a cylindrical roller bearing. At right are some of the vital factors which must be considered.

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GM GENERAL MOTORS

HYATT

HY-ROLL BEARINGS

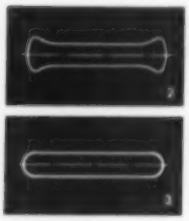
FOR MODERN INDUSTRY

1. DISTRIBUTION OF LOAD WITHIN THE BEARING

Rollers are subjected to load only while in the "load zone," with maximum load while on the line of action of the bearing load, as shown in diagram 1. The theoretically perfect "load zone" extends from −90° to +90° from the line of action, but this is neither practical nor necessarily desirable. Under normal loadings, the actual "load zone" may range from 90° to 120°, depending on load and mounted internal clearance. This distributes the load so the load on the heaviest-loaded roller is approximately 5/N times the bearing load, where N is number of rollers.

2. DISTRIBUTION OF LOAD WITHIN ROLLER'S AREA OF CONTACT

A cylinder deflects locally in the region of engagement when loaded between flat plates. The plate also deflects, so the original line of engagement is broadened into a "dog-boned" area under load, as shown in diagram 2. Moreover, deflected cylinders must gather in metal at their ends in *two planes, and this end-loading effect can seriously reduce the life of a cylindrical roller bearing.* All HYATT rollers have generous corner radii or blended chamfers to reduce end effect; and all HYATT Hy-Load rollers also have crowning to allow the contact area to "fade out" evenly (diagram 3).

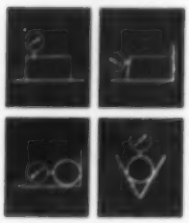


3. DISTRIBUTION OF LOAD ACROSS ROLLER

The unit load on any roller is uniformly distributed axially except at the crowned ends where it drops off to zero as shown in diagram 4. The summation of unit loads represented by *area* A is the total roller load. This same load under misalignment results in an area equal to area A; but maximum unit load is considerably greater and the bearing will have a shorter life than a properly aligned one. When the same total load is applied to an *uncrowned* roller, an even higher unit load results. This demonstrates the value of crowning when misalignment occurs.

4. EFFECT OF ROLLER QUALITY ON BEARING PERFORMANCE

Lack of roller quality control has a very adverse effect on performance: 1. A roller with excessive *taper* tends to uneven load distribution and abnormal temperature rise. 2. A roller with excessive *end square* tends to noisy bearing performance. 3. A roller with excessive *two-point out-of-round* tends to poor segregation and poor bearing life. 4. A roller with excessive *three-point out-of-round* tends to noisy bearing operation. 5. A roller with *poor finish* tends to wear on all operating surfaces and noisy operation. 6. A bearing with excessive *roller-to-roller diameter variation* tends to poor bearing life. 7. A bearing with excessive *roller-to-roller length variation* tends to poor thrust capacity, abnormal temperature rise.



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Imagine the brute power it takes to move this behemoth—even more, the joint-strength it needs to hang together despite the strains and stresses it undergoes! It typifies what's been happening in the earthmoving equipment field. They're making them bigger, more powerful, more rugged.

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Proper application of standard fasteners can save you money. Ask the RB&W "Fastener Man" to show you how. Contact your nearest RB&W office.

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

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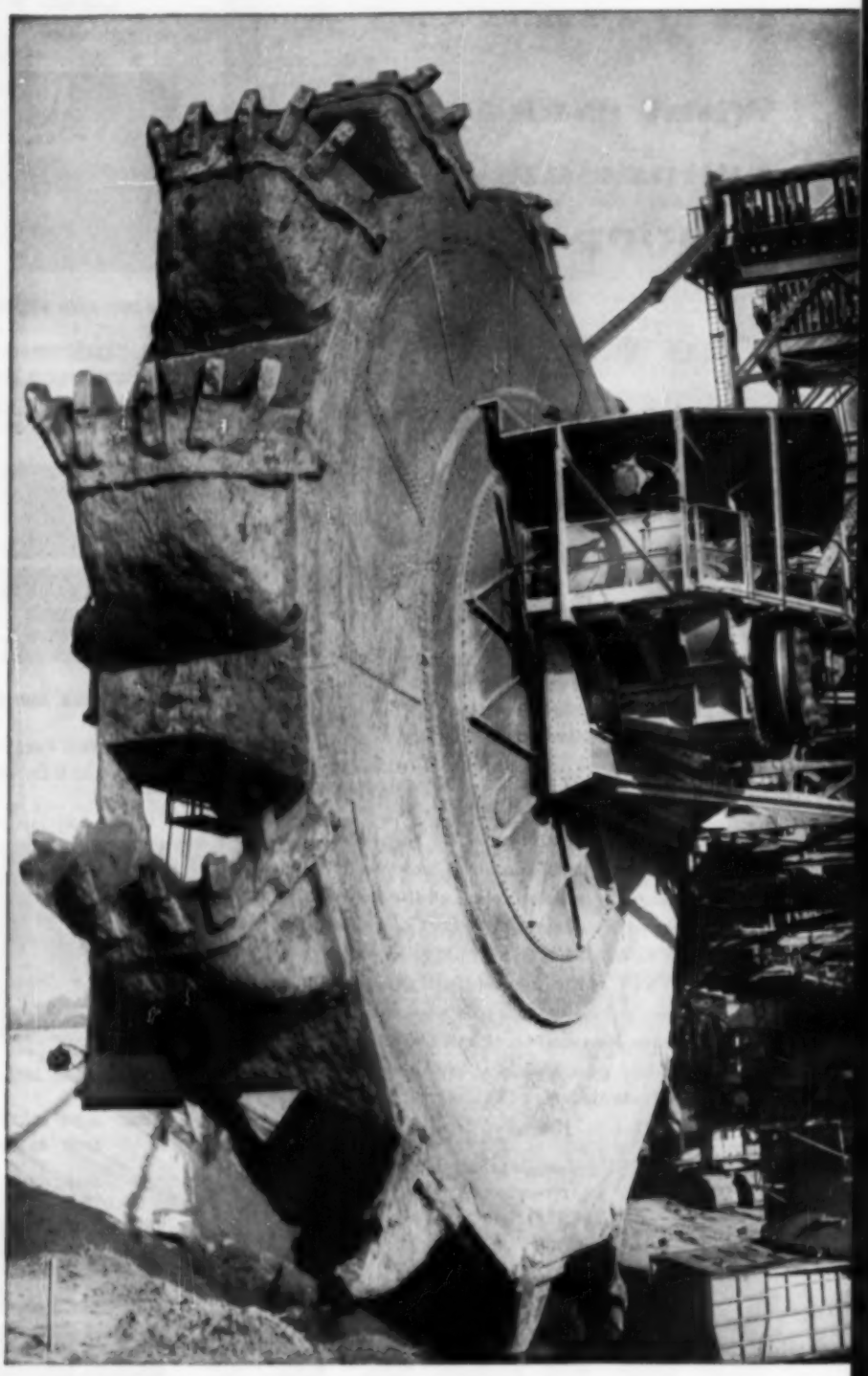
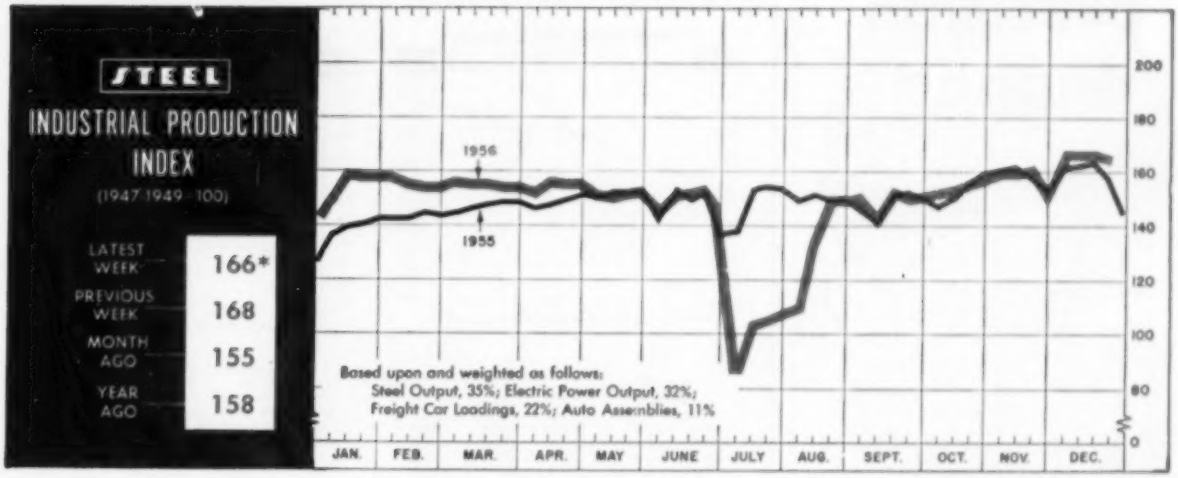


RB&W FASTENERS - *Strong Point of any assembly*



*Week ended Dec. 22.

Year-End Trends Point Strongly Upward

BUSINESS TRENDS are so strongly upward at the close of 1956 that it is unlikely that the trend will reverse within the foreseeable future.

A survey of 140 statistical series on 1956 production and sales which will appear in the Facts and Figures section of STEEL's annual Yearbook issue (Jan. 7, 1957) reveals that 85 are up, 45 down and only 11 about equal compared with 1955. The statistics cover metalworking from air conditioners to zinc products. Conclusion: Metalworking, which accounts for about one-third of the total economy, will have a whale of a good first half, with chances of an equally good second half.

Both Sides — There are those who say that we are at present on the tail end of the boom—that before 1957 is too old, we will see a leveling off or downturn. But the vast majority of 7500 plant managers surveyed by STEEL believe the trend will continue up, and they have never been wrong about the direction.

The 45 downward trends are fairly well distributed in the four or five major industries noted for bucking the trend this year: Foundry, farm machinery, residential construction, appliances, and automotive. The steel industry, and those dependent on it, make up a considerable portion of the "downs," but in a sense they can be discounted because of the steel strike.

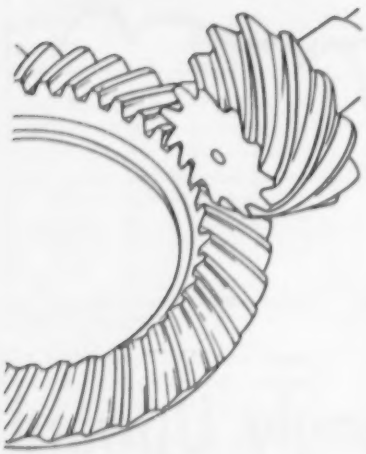
All But One—Of the weak spots, only residential construction looks like it will repeat the performance in 1957. Even there, new housing starts are not expected to fall below 1 million, a level the industry still considers as good. Foundries are looking forward to a pickup on the strength of brisk demand for heavy machinery and improved auto sales. Farm machinery makers feel that the worst is over for them. With agricultural earnings showing signs of an upturn, they see an improved sales potential for early spring and summer. Appliance makers are geared for an-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,462[1]	2,511	2,309
Electric Power Distributed (million kw-hr)	12,200[1]	12,220	11,614
Bituminous Coal Output (1000 tons)	10,655	10,610	10,500
Petroleum Production (daily avg—1000 bbl)	7,360[1]	7,355	6,992
Construction Volume (*ENR*—millions)	$456.6	$528.1	$458.4
Auto, Truck Output, U. S., Canada (*Ward's*)	191,185[1]	195,045[1]	177,250
TRADE			
Freight Car Loadings (1000 cars)	670[1]	717	672
Business Failures (Dun & Bradstreet)	249[1]	270	247
Currency in Circulation (millions)[3]	$31,835	$31,660	$31,364
Dept. Store Sales (changes from year ago)[3]	+2%	−3%	+6%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$24,000[1]	$22,112	$24,569
Federal Gross Debt (billions)	$276.2[1]	$276.2	$280.6
Bond Volume, NYSE (millions)	$35.0[1]	$33.3	$18.1
Stocks Sales, NYSE (thousands of shares)	11,900[1]	11,811	11,938
Loans and Investments (billions)[4]	$86.5	$86.2	$85.7
U. S. Govt. Obligations Held (billions)[4]	$25.9	$25.8	$29.6
PRICES			
STEEL's Finished Steel Price Index[5]	225.92	225.92	208.90
STEEL's Nonferrous Metal Price Index[6]	252.5	253.2	270.2
All Commodities[7]	116.1	116.2	111.2
Commodities Other Than Farm & Foods[7]	124.7	124.6	119.5

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1956, 2,461,895; 1955, 2,413,278. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

precision lapped



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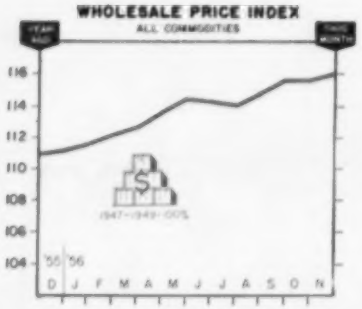
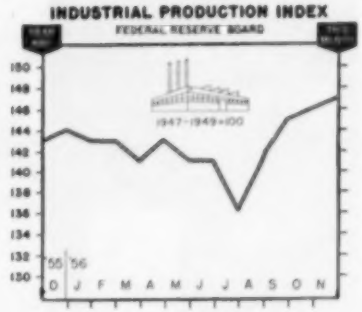
THE BUSINESS TREND





	1956	1955	1954
Jan.	111.9	110.1	110.9
Feb.	112.4	110.4	110.5
Mar.	112.8	110.0	110.5
Apr.	113.6	110.5	111.0
May	114.4	109.9	110.9
June	114.2	110.3	110.0
July	114.0	110.5	110.4
Aug.	114.7	110.9	110.5
Sept.	115.5	111.7	110.0
Oct.	115.6	111.6	109.7
Nov.	115.9	111.2	110.0
Dec.	....	111.4	109.5

U.S. Bureau of Labor Statistics.
*Preliminary.
Charts copyrighted, 1956, STEEL.

(Seasonally adjusted)

	Total Production		Primary Metals		Metal Fabricating	
	1956	1955	1956	1955	1956	1955
Jan.	143	132	148	127	170	157
Feb.	143	133	148	131	168	157
Mar.	141	135	145	136	166	160
Apr.	143	136	145	138	171	160
May	141	138	141	140	167	163
June	141	139	135	143	168	164
July	136	139	68	134	169	166
Aug.	142	140	124	139	173	168
Sept.	145	142	148	146	176	171
Oct.	146	143	147	145	177	173
Nov.	147*	143	149*	119	180*	172
Dec.	...	144	...	151	...	172
Avg.	...	138	...	130	...	165

Federal Reserve Board. *Preliminary.

other good year, rivaling perhaps the plush year in 1955. Several of the "neutral" statistical series were in the small appliance field. It wouldn't take much to make them strong plusses. Finally, the auto industry—the tail that some economists feel wags the dog—is heading for its second best year.

Even though the statisticians, economists and plant managers seem almost unanimous in their optimism, there is the danger of a "pie in the sky" attitude catching us napping. The price pages of Facts and Figures make it plain that prices are pointing just as strongly upward as is production. The scale which has been used for several years on STEEL's chart for wholesale prices (see above) had to be redrawn this week to keep the trend line from going out of bounds. Consumer prices are going up almost as rapidly.

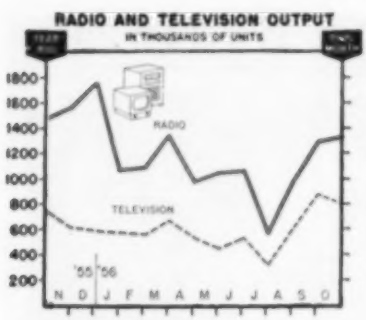
Watch Inventories—Another potential danger is inventories. They are mounting again. Some of the increase is needed to support the higher rate of production; some of it is explained by higher book values of old stocks; and some of it is replenishing stocks depleted after the steel strike. But if world tension causes excessive stocking of materials, shortages will develop and it will become necessary to rescale the price index chart once more. The result could be a rolling adjustment similar to that of 1949 or 1954 by late next year. Fortunately, few businessmen see this in the cards.

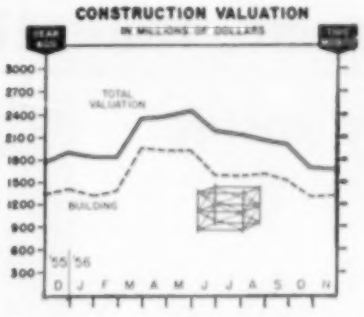
Index Eases Off Seasonally

STEEL's industrial production index reflects this high level of activity at year end. After holding at a record 168 (1947-1949=100) for three weeks, it backed off to a preliminary 166 during the week ended Dec. 22. Chief cause was a seasonal decline in loading of revenue freight by the railroads. With the iron ore season closed, this segment of the index will be a retarding factor, offsetting the seasonal gains in production of electricity. There was a further weakness in auto production as the result of a strike in the Fisher Body plant supplying Pontiac Division of General Motors.

FRB Index Record Possible

The level of STEEL's production index forecasts a new record for the Federal Reserve Board's





	Radio		Television	
	1956	1955	1956	1955
Jan.	1,079	1,066	588	655
Feb.	1,094	1,090	576	703
Mar.	1,360	1,482	680	831
Apr.	993	1,100	550	583
May	1,060	1,114	468	467
June	1,073	1,205	553	590
July	567	718	337	344
Aug.	991	948	613	648
Sept.	1,319	1,302	894	940
Oct.	1,349	1,500	821	760
Nov.	....	1,581	...	632
Dec.	....	1,786	...	605
Totals	....	14,895	...	7,767

Radio-Electronics-Television Mfrs. Assn.

	Total		Building	
	1956	1955	1956	1955
Jan.	1,858.2	1,504.5	1,355.7	1,255.1
Feb.	1,859.7	1,581.1	1,429.3	1,278.6
Mar.	2,382.0	2,134.8	1,986.5	1,748.6
Apr.	2,421.5	2,322.1	1,985.6	1,776.1
May	2,479.8	2,185.1	1,948.7	1,737.1
June	2,197.8	2,255.2	1,620.5	1,793.7
July	2,148.6	2,271.5	1,606.3	1,851.6
Aug.	2,068.8	1,894.8	1,621.0	1,516.9
Sept.	2,024.8	2,034.9	1,539.7	1,442.2
Oct.	1,706.4	1,862.7	1,331.9	1,474.8
Nov.	1,689.3	1,796.8	1,354.4	1,388.3
Dec.	.....	1,920.8	.....	1,438.0
Totals	.....	23,764.3	.....	18,701.0

F. W. Dodge Corp.

seasonally adjusted industrial production index in December. The present record of 147 (1947-1949 = 100) was established last month (see chart, page 46). While actual production was less in November than in October, it was not off as much as usual, resulting in the higher adjusted figure. December should reach 148 of the base period, seasonally adjusted.

MHI Expects 1957 Record

Sales of material handling equipment in 1957 are expected to exceed the record set this year, say directors of the Material Handling Institute Inc. This year in turn exceeded 1955, the previous banner year, by more than 20 per cent. The directors caution that possible shortages of steel and generally tight money may slow up some expansion programs. Also, the automotive industry, a big factor this year, may not be as strong in 1957 because retooling needs will be down.

Radios, TV Closing Fast

Producers of radios and television sets had one of the best months this year in October. Production of 1,348,864 radios was the best showing since the 1,360,113 mark in March (see chart above). Production of 820,781 TV sets was topped this year only in September. October's output was 61,046 sets more than the industry produced in October, 1955, says Radio-Electronics-Television Manufacturers Association. RETMA also says that production of transistors in the first ten months of 1956 has more than tripled over the corresponding period of last year.

Freight Car Deliveries Up

Railroad car builders delivered more freight cars last month than in any month since October, 1953. In building 6695 units, they passed the 5000 mark for the eighth time in the last nine months. New orders, at 4172, were below the prior month but above the average of 3346 for 1956. Current backlog is 119,626 cars. During the first 11 months of the year, the backlog has diminished at the rate of 2302 units a month. If new orders were to continue at their present average rate, it would take car builders over four years to erase this backlog.

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Straight Shank, Right Hand Cut with Straight, Right or Left Hand Spiral Flutes.
14 Sizes from .1230 thru .4995" Sets, too!

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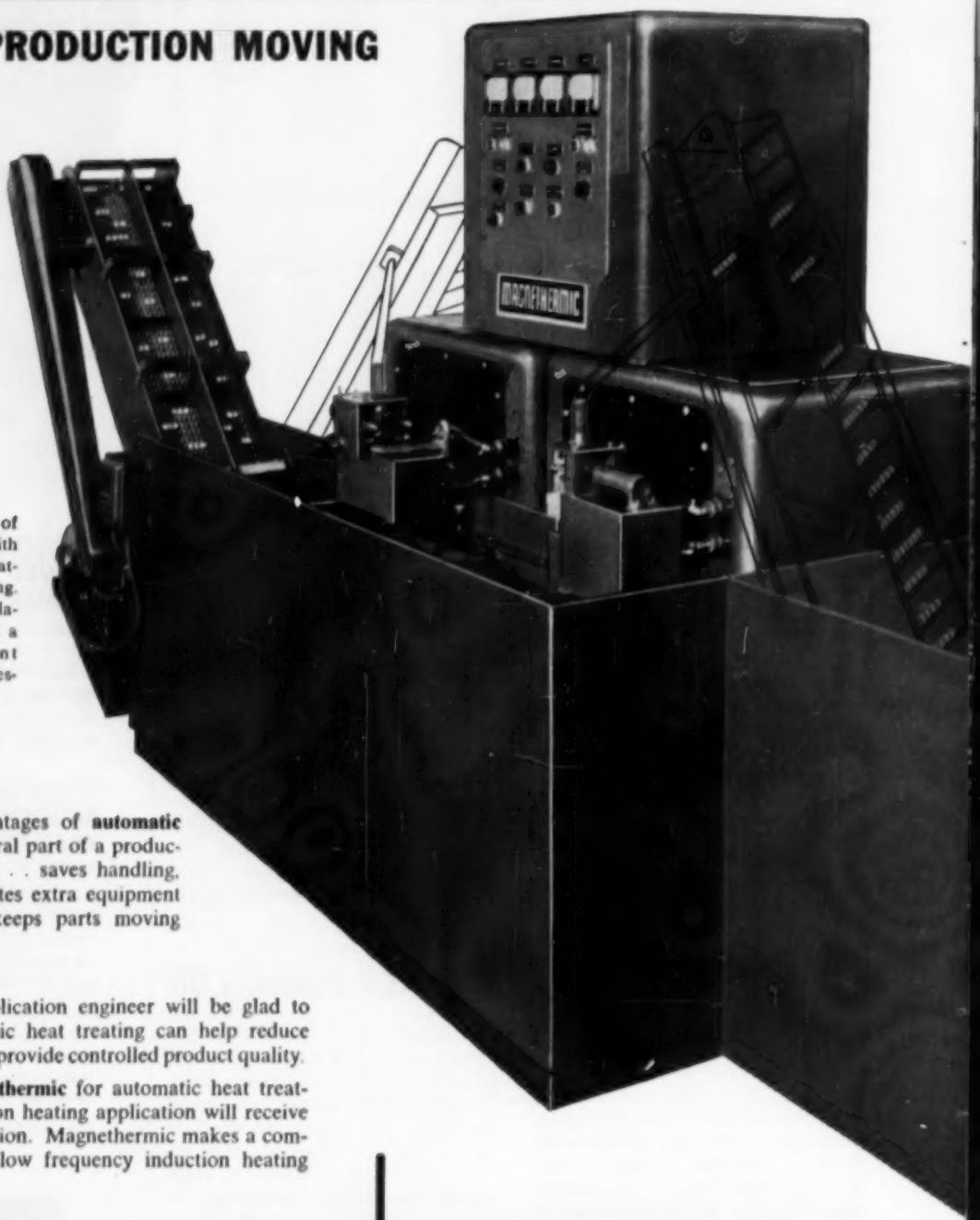
AUTOMATIC HEAT TREATING

with Magnethermic Induction Heaters

KEEPS PRODUCTION MOVING



Here is another example of automatic heat treating with Magnethermic Induction Heaters and automatic feeding. This Magnethermic installation keeps parts moving at a steady rate to subsequent operations. Loading is necessary only once per shift.

You know the advantages of **automatic heat treating** as an integral part of a production or machining line . . . saves handling, controls quality, eliminates extra equipment and, most important, keeps parts moving continuously.

A Magnethermic application engineer will be glad to show you how automatic heat treating can help reduce manufacturing costs and provide controlled product quality.

An inquiry to Magnethermic for automatic heat treating or any other induction heating application will receive prompt, intelligent attention. Magnethermic makes a complete line of high and low frequency induction heating equipment.

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INDUCTION HEATING EQUIPMENT

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corporation
YOUNGSTOWN 7, OHIO

WESLEY D. HAMILTON
. . . heads International Steel Co.

Wesley D. Hamilton was elected president and chief executive officer of **International Steel Co.**, Evansville, Ind. He succeeds **Walter G. Koch**, now chairman. Mr. Hamilton was executive vice president in charge of operations.

James E. Borchert was named to the new post of general purchasing agent of productive materials and operating supplies for **A. O. Smith Corp.**'s central purchasing, Milwaukee. Mr. Borchert was assistant to the purchasing director.

Howard H. Shakely, consultant to the chief engineer, **Jones & Laughlin Steel Corp.**, Pittsburgh, was named plants engineer. **P. H. Reynolds Jr.**, formerly staff engineer-rolling mills, was named contract engineer. **John G. Blissell** was made specification and control engineer. He was chief design draftsman in the design engineering department of J&L's Aliquippa, Pa., Works.

Harry M. Lange was appointed southern sales manager of **American Cast Iron Pipe Co.** at Birmingham. He succeeds **Thomas M. Starnes**, retired after 45 years' service. **Howard Sisson** succeeds Mr. Lange as assistant southern sales manager.

Floyd H. Walters was made director of manufacturing, rockets division, **Bell Aircraft Corp.**, Buffalo. He was with Lincoln-Mercury Division, Ford Motor Co.

A. H. SCHOTT
. . . gen. mgr., Ohio Crankshaft div.

A. H. Schott was appointed general manager, Crankshaft & Camshaft Division, **Ohio Crankshaft Co.**, Cleveland. He was factory manager.

Byron C. Booth was elected president, **George W. Borg Corp.**, Delavan, Wis. **G. Marshall Borg** was elected vice chairman of the board of directors. **George W. Borg**, chairman and previously president, will devote more of his time to corporate policies. **Ralph A. Ackerman**, production manager, was promoted to division manager, Borg Equipment Division, at Janesville, Wis.

R. W. Thiel was named superintendent of U.S. Steel Corp.'s **American Bridge Division** at Birmingham. He succeeds **R. B. Elliott** who was made superintendent of the Gary, Ind., plant of the division.

Gen. Benjamin W. Chidlaw, USAF, ret., was elected chairman of the planning committee of **Thompson Products Inc.**, Cleveland. General Chidlaw joined the company 18 months ago as a vice president.

Arthur C. Wicker joined the staff of the sales development department, **Tube Turns**, Louisville.

Arnold R. Jones was made superintendent of mechanical construction and maintenance by **Norton Co.**, Worcester, Mass. He succeeds **John W. Johnson**, retired.

DONALD M. McGRATH
. . . Solar Aircraft San Diego plant mgr.

Donald M. McGrath was named plant manager of **Solar Aircraft Co.**'s San Diego, Calif., plant. He was general manager of the Utica Division of Bendix Aviation Corp.

Carl F. Herbold and **Ralph J. Eschborn** were elected vice presidents of **Jack & Heintz Inc.**, Cleveland. Formerly assistant to the president, Mr. Herbold will direct manufacturing operations and be responsible for industrial relations. Mr. Eschborn, formerly chief engineer, is responsible for all engineering activities.

Fred M. Gillies was elected chairman and chief executive officer of **Acme Steel Co.**, Chicago. **Guy T. Avery** was elected president and chief administrative officer. **Carl J. Sharp**, former chairman, continues as chairman of the executive committee.

Raymond A. Rich was elected president of **Avco Mfg. Co.**, New York. He succeeds **Victor Emanuel**, who is chairman. Mr. Rich was formerly vice president of Philco Corp.

Leo J. Brancato was appointed a vice president of **Heli-Coil Corp.**, Danbury, Conn. Chief engineer in charge of product development and research since 1954, he continues to head the engineering department along with his corporate duties.

Heald Machine Co. named **E. Bruce Crabtree** branch manager of its Dayton, O., sales office; **Homer R.**

Geoffrion, branch manager of its Indianapolis sales office.

C. J. Duby, chief engineer for **Republic Steel Corp.'s** Warren, O., district, was made chief engineer for the International Projects Division; **M. H. Warlow,** formerly assistant industrial engineer in Warren, was made assistant chief engineer of the division. Both continue headquarters at Warren. Replacing Mr. Duby as district chief engineer is **I. H. Lundgren,** former assistant chief engineer. Succeeding Mr. Warlow as assistant industrial engineer is **F. F. Kemp.**

Myron L. Ball was made Atlanta district sales manager, power piping and sprinkler division, **Blaw-Knox Co.**

Fred G. Brear was made assistant sales manager in **Kaiser Steel Corp.'s** southern district sales office, Los Angeles. He succeeds **A. L. Peake,** now assistant manager, central district sales office, Oakland, Calif.

Four Wheel Drive Auto Co. named **Lynn F. Perrott** district sales manager at Portland, Oreg., covering Washington, Oregon, Idaho, Alaska and British Columbia. **Virgil Phelps,** at Akron, O., serves as district sales manager for Ohio, Kentucky, West Virginia and counties in western Pennsylvania and western New York.

Albert W. Ondis was made eastern regional manager for **Brush Electronics Co.,** division of Clevite Corp. He will operate the company's standard products office at Arlington, Va., and will supervise eastern sales.

Herbert D. Barnhart was made manager of the instrumentation, materials and process laboratory of **General Electric Co.,** Syracuse, N. Y. He was with GE's locomotive and car equipment department in Erie, Pa.

John Chickering was made Washington branch manager for **Federal Pacific Electric Co.**

Harold C. Sager was made manager of the automation sales department, **Stromberg - Carlson,** Rochester, N. Y. He was a partner in K & K Metal Works, Buffalo.

ROBERT S. LYNCH

HOWARD B. JOHNSON

. . . Atlantic Steel chairman and president

Robert S. Lynch was elected chairman and chief executive officer of **Atlantic Steel Co.,** Atlanta. He is succeeded as president by **Howard B. Johnson. Charles F. Stone,** board chairman since 1947, was named chairman of the executive committee. Mr. Lynch, president since 1947, also is chairman of Continental Gin Co., Birmingham. Mr. Johnson has been executive vice president since September.

Executive direction of **Hubbard & Co.,** Pittsburgh, has been combined in the offices of chairman and president. **Charles H. Dyson,** chairman, also assumes the duties of **James H. Knowles,** president since 1953, who resigned.

Continental Gin Co., Birmingham, named **George C. Morgan** vice president in charge of the industrial division; **Nelson J. Kemp,** vice president-finance.

H. Melvin Carnahan was named general sales manager for **Cherry-Burrell Corp.,** Chicago. He was with Chrysler Corp.'s Airtemp Division as sales manager for residential air conditioning and heating.

At **Westinghouse Electric Corp.'s** commercial atomic power department, Schenectady, N. Y., **W. D. Shepherd** was made assistant to the manager; **W. L. Budge,** sales manager; **O. C. Kebernick,** assistant sales manager.

Berger Division, Republic Steel Corp., named **Brooke K. Williams** Detroit sales representative; **Tom R. Rogers,** sales representative, New York City. Mr. Williams succeeds **Gordon R. Snyder,** recently made Pittsburgh district sales manager.

Byron H. Brown was made assistant district sales manager at Cincinnati for **Republic Steel Corp.** He succeeds **Robert G. Shrake,** now assistant district sales manager at Buffalo.

Jack H. Hopper was made manager of application engineering, east central district, for **General Electric Co.'s** apparatus sales division, Cleveland.

D. J. LaBelle was made truck engineer, **GMC Truck & Coach Division,** General Motors Corp., Pontiac, Mich. He succeeds **L. T. Flynn** who transferred to the fleet sales department of the division.

Herbert G. Haussig was appointed to the engineering staff of **Johnston & Funk Titanium Corp.,** Wooster, O.

Dr. E. R. Jette was made director of **Union Carbide Research Institute,** Union Carbide & Carbon Corp., New York. He was head of the chemistry and metallurgy division of Los Alamos Scientific Laboratory, New Mexico.

Frederick A. Wolfe Jr. was made product sales manager for Panelescent lamps made by the lighting

Look What You Can Do

on CINCINNATI No.1 CUTTER AND TOOL GRINDERS

You can do a lot of fine work on CINCINNATI® No. 1 Cutter and Tool Grinders . . . the type of work that will help your production machines operate at higher efficiency. CINCINNATI No. 1's are designed to sharpen and recondition a variety of small- to medium-sized cutters; to sharpen them accurately, quickly, safely. The No. 1's are tops for the type of cutter and tool grinding operations shown here. Reasons why are outlined in an attractive 20-page catalog. Get a copy and show it to your men who are responsible for this type of work. You can count on their opinion. Brief specifications will be found in Sweet's Machine Tool File, and complete data may be obtained by writing for catalog No. M-1852-1.

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CINCINNATI No. 1 Cutter and Tool Grinder, Catalog M-1852-1

*Surface Grinding Attachment. Extra equipment.

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Grind lathe and planer tools*

Sharpen shell end mill cutters

Sharpen stagger tooth cutters

Cylindrical grind diameters†

Grind flat surfaces*

CINCINNATI

WILLIAM C. ROWLAND
. . . Alten Foundry & Machine supt.

F. J. LLOYD JR.
. . . Dravo Corp. vice president

JAMES F. JONES
. . . A. O. Smith division manager

division of **Sylvania Electric Products Inc.** at Salem, Mass.

William C. Rowland was appointed foundry superintendent of **Alten Foundry & Machine Works Inc.**, Lancaster, O. He succeeds **Val Young**, retired. Mr. Rowland has been assistant foundry superintendent since 1952.

T. E. Borton Jr. joined **United Tube Corp.** as Chicago district sales manager. He was with the Chicago regional sales office of Republic Steel Corp.'s steel and tubes division.

John W. Rane Jr. was made director of engineering and sales in the new aircraft division of **Bell Aircraft Corp.**, Buffalo.

Fischer Special Mfg. Co. appointed **W. Roy Koll** direct factory representative in Missouri, Kansas, Nebraska and southern Illinois. He is located in St. Louis. Mr. Koll was director of sales at Stewart Iron Works.

F. J. Lloyd Jr., general manager, Keystone Division, **Dravo Corp.**, Pittsburgh, was elected a vice president of the corporation.

Ralph M. Thomas was appointed assistant general superintendent of the Bessemer, Ala., rolling mill, **Tennessee Coal & Iron Division**, U.S. Steel Corp. He succeeds **Augustus Cook**, recently made superintendent of the bessemer mill.

Philip G. Monteith was made assistant to the sales manager, **Laclede-Christy Co. Division**, H. K. Porter Company Inc., St. Louis.

Mahlon E. Wood joined **Reynolds Metals Co.** as special representative in the automotive market sales division. He has headquarters in Detroit.

W. D. Regnier succeeds **Ralph E. Costa**, resigned, as division sales manager, machinery division, **Crown Cork & Seal Co. Inc.**, Baltimore.

James F. Jones was named manager of the Milwaukee automotive and railroad products divisions for **A. O. Smith Corp.** He joined the corporation last January as assistant manager of the automotive division. Previously, he was vice president-sales in the special products division of American Motors Corp.

William A. Keller joined **Kiekhaefer Corp.**, Fond du Lac, Wis., as vice president of marketing. He was sales manager, Studebaker Division, Studebaker - Packard Corp.

Dr. Ralph P. Perkins succeeds **Dr. Edgar C. Britton**, retired, as director of **Dow Chemical Co.'s** organic research laboratory at Midland, Mich. Dr. Britton will serve as a research consultant.

United States Testing Co. appointed **Douglas R. Deane** a senior engineer in its electronics department, Hoboken, N.J.

OBITUARIES . . .

Alden G. Roach, president, **Columbia-Geneva Steel Division**, U.S. Steel Corp., was killed in a plane crash in Pennsylvania Dec. 20.

Herbert O. James, 60, president, **D. O. James Gear Mfg. Co.**, Chicago, died Dec. 14.

Rear. Adm. Arthur J. Hannah, USN, ret., chairman of **J.G.M. Mfg. Co.**, San Diego, Calif., died Dec. 11.

Neal S. Croft, 46, industrial engineering manager at **Cold Metal Products Co.**, Youngstown, died Dec. 15.

Erwin Eliel, 45, vice president and treasurer, **Associated Metals & Minerals Corp.**, New York, died Dec. 16.

John Holland, 58, sales promotion manager, lighting division, **Sylvania Electric Products Inc.**, at Salem, Mass., died Dec. 15.

Frank D. Lalle, 45, an industrial engineer at **White Motor Co.**, Cleveland, died Dec. 15.

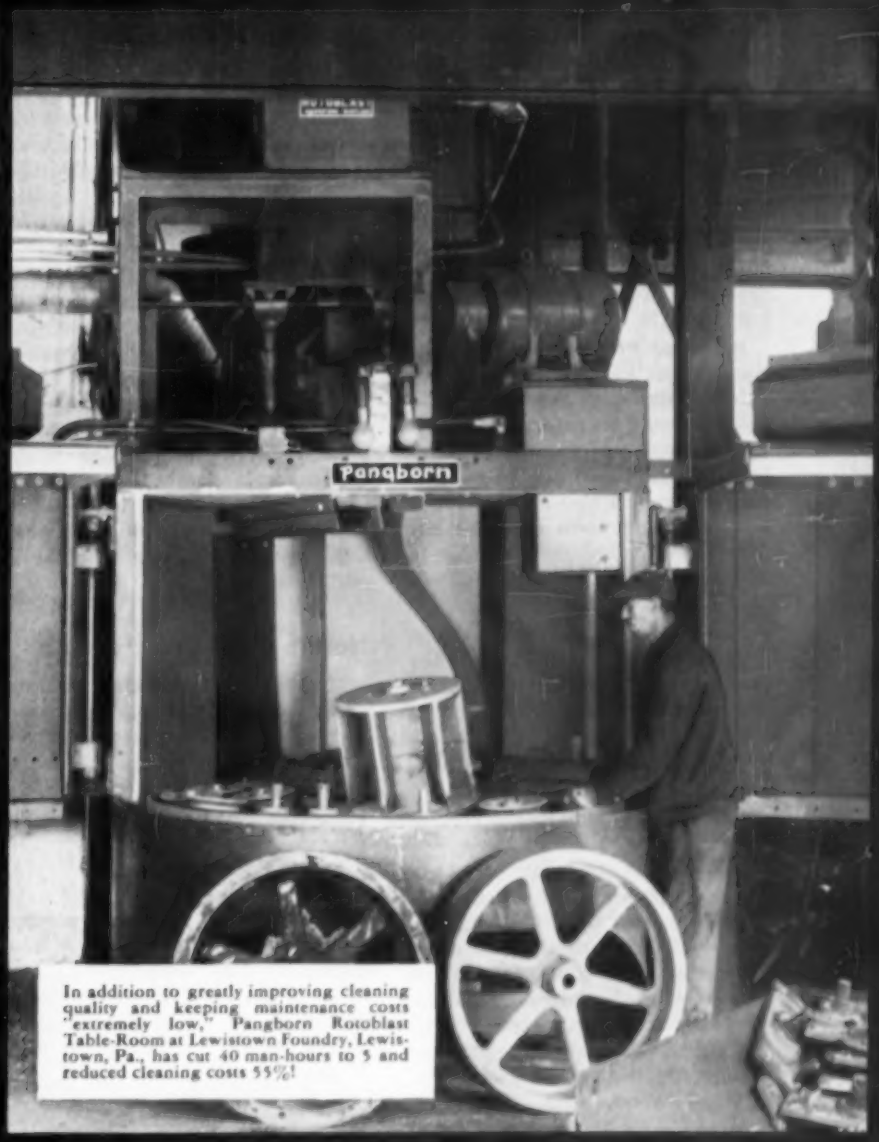
A. G. Walker, chief engineer, **Kent Machine Co.**, Cuyahoga Falls, O., died Nov. 28.

Pangborn Rotoblast® reduces cleaning costs 55% at Lewistown Foundry!

One foundry says it "cuts labor costs." Another says it "reduces maintenance." A third says, "speeds production." Foundries that blast clean with Pangborn Rotoblast equipment can offer different reasons —and combinations of them—for Rotoblast's cost-cutting operation.

They all add up to one thing—*lowest cost per ton of castings cleaned!* That's because Pangborn Rotoblast cleans thoroughly, quickly, automatically. You get a finer, uniform finish on your jobs; power and labor costs go down; maintenance costs drop; production goes up.

Check your present cost per ton and then find out how Pangborn can *slash* your cleaning costs. Write for Bulletin 227 to PANGBORN CORPORATION, 1600 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Blast Cleaning and Dust Control Equipment.*



In addition to greatly improving cleaning quality and keeping maintenance costs "extremely low," Pangborn Rotoblast Table-Room at Lewistown Foundry, Lewistown, Pa., has cut 40 man-hours to 5 and reduced cleaning costs 55%!

And cuts labor costs in half at Keen!

Pangborn Rotoblast Table and Rotoblast Barrel at Keen Foundry, Griffith, Ind., clean *three times faster* than previous equipment, cut cleaning room labor costs 50%!

Pangborn

BLAST CLEANS CHEAPER

Rotoblast Blastmaster® & Continuous-Flo Barrel

Rotoblast® Tables & Table-Rooms

Special Blast Rooms & Cabinets

Pangborn Dust Control Equipment

Distributors for Malleabrasive and Tru-Steel Abrasives

New Titanium Firm

Allied Chemical and Kennecott will invest $40 million to launch jointly owned venture

A NEW COMPANY will be formed by Allied Chemical & Dye Corp. and Kennecott Copper Corp. to produce and sell titanium. It will be equally owned by the parent corporations and will entail an initial investment of $40 million. Operations will be expanded as industry demands develop.

A plant will be constructed at an unannounced site. Production of titanium tetrachloride, titanium sponge and titanium billets is scheduled to start late in 1958.

Improved Processes—A continuous process, recently developed by Allied Chemical's Solvay Process Division, will be employed. Sodium is used to reduce titanium tetrachloride to titanium sponge. Allied Chemical also has developed an improved process for the manufacture of titanium tetrachloride which permits the use of titanium slag as the raw material.

Kennecott's subsidiary, Chase Brass & Copper Co. Inc., has developed processes for melting and fabricating titanium. They will be used in the new operation.

The company is expected to expand pilot plant work and market development on an iodide process which is used in the production of titanium with special properties.

The corporation will be separate from Quebec Iron & Titanium Corp. which is partly owned by Kennecott and which mines and processes iron-titanium ore to produce pig iron and titanium slag. The slag is one of the starting materials for titanium pigment and titanium metal.

Organizes Research Institute

Union Carbide & Carbon Corp., New York, established the Union Carbide Research Institute. It will be located on the corporation's Westchester property near Tarrytown, N. Y. Its work (basic scientific research) will be under the administration of Dr. Augustus Kinzel, vice president-research. Dr. E. R. Jette has been appointed director of the institute. Facilities are scheduled to be completed by the spring of 1958.

Searches for Titanium Ores

Columbia - Southern Chemical Corp., Pittsburgh, will soon begin exploratory operations in Liberia, West Africa, for titanium-bearing ores. The firm has initiated a similar search on Padre Island, off the coast of Texas near Corpus Christi. Titanium ores are used by Columbia-Southern in the manufacture of titanium tetrachloride at Natrium, W. Va.

To Develop Iron Ore Property

Julian Iron Co., a subsidiary of Canadian Javelin Ltd., Montreal, Que., has been formed to develop a large iron ore property on Lake Julian, 20 miles north of the Wabush lake deposit—it is within present Javelin concessions. Estimated reserves in the Julian deposit are in excess of 500 million tons. The firm is negotiating with a foreign steel group to build a mill on the site.

Modern Corp. Changes Name

Modern Corp., Detroit, producer of special tooling, changed its name to Modco Tools, a division of Valeron Corp., that city.

True-Trace Opens Two Branches

True - Trace Corp., El Monte, Calif., manufacturer of hydraulic tracing controls for metal cutting machines, opened these new branches: 1405 16th St., Racine, Wis., in charge of D. E. Harrison; 35 Urban Ave., New Cassel, Long Island, N. Y., in charge of Len Dubuke.

Four Railroad Divisions United

American Brake Shoe Co., New York, will unite four of its railroad divisions in a newly created Railroad Products Division, effective Jan. 1. Included will be the railroad product facilities of the Brake Shoe & Castings Division, the National Bearing Division, the Ramapo Ajax Division and the Southern Wheel Division. Headquarters will be in New York. President of the new division is S. S. Conway; vice president for sales, E. Johnson Jr.; vice president in charge of production, R. L. Salter; assistant vice president for production, R. A. Frick; vice president-engineering, R. L. Wilson. Over-all responsibility for the division is assigned to J. S. Hutchins, executive vice president.

Rheem Opens West Coast Plant

Rheem Automotive Co., a division of Rheem Mfg. Co., formally dedicated its multimillion dollar plant at Fullerton, Calif. The division makes bumpers, bumper guards, bumper hangers, coil springs, leaf springs, spring shackles and torsion bars for automobile assembly plants. Other products include highway guard rails, guard rail brackets and forged oil tools. Frank G. Fisher is vice president and general manager.

GE Leases Space in Utica

General Electric Co.'s Light Military Electronics Equipment Department leased 75,000 sq-ft of space in a Utica, N. Y., factory to expand its operations in that city.

Barium Steel Sells Subsidiary

Barium Steel Corp., New York, sold its wholly owned subsidiary, Jacobs Aircraft Engine Co., to Philip Kahn and associates. The new owners will continue the operations of the plant.

Opens Tubing Mill in Florida

James Steel & Tube Co., Madison Heights, Mich., is opening an additional factory in North Dade (Miami), Fla. The firm makes electricweld tubing and tubular products.

Fairmount Steel Changes Hands

Adolph O. Schaefer, president of Pencoyd Steel & Forge Corp., and a group of his associates have purchased the Fairmount Steel Corp. property and mills in Philadelphia. Included are numerous buildings, electric arc furnaces, hydraulic forging presses, machine shops and heat-treating equipment. Pencoyd will continue to operate the plant without interruption.

Products will be premium quality steel forgings (such as rotor forgings for steam turbines), forgings for extrusion press parts, stainless and alloy steel ingots and electric furnace steel billets.

Raytheon Sets Up Laboratory

Raytheon Mfg. Co., Waltham, Mass., is setting up a laboratory in the former Assabet Mills (textiles) at Maynard, Mass.

Trabon Opens Solon Plant

Trabon Engineering Corp. officially opened its $300,000 plant at 28815 Aurora Road, Solon, O. The firm makes centralized oil and grease systems for industry.

CONSOLIDATIONS

Ex-Cell-O Corp., Detroit, acquired two firms: **Cadillac Gage Co.**, Roseville, Mich., and **Smith Bearing Co.**, Trenton, N. J. The two firms will operate as separate units under existing management. Cadillac Gage produces plug and ring gages, a special height gaging device, servovalve mechanisms and a turret fire control mechanism for Army tanks.

Air Reduction Sales Co., a division of Air Reduction Co. Inc., New York, purchased **Jackson Products Inc.**, Warren, Mich. A. C. Gilbert has been named general manager of the Jackson organization, producer of welding electrode holders, welding helmets, safety goggles and other welding supplies.

ASSOCIATIONS

Association of Steel Distributors Inc., New York, elected these eastern regional officers: Chairman, Saul Bradburd, Interstate Iron & Supply Co., Philadelphia; vice chairman, P. D. Wingate, Hamden Steel & Aluminum Co., New Haven, Conn.; secretary, Arnold Hanson, Amay Steel Co., New York; and treasurer, Henry Roberts, Atlantic Steel & Trading Co. Inc., Boston.

Officers of the midwest region are: Chairman, Walter Ising, Laube Steel Co., Chicago; vice chairman, Manny J. Sugar, Calumet Iron & Supply Co., East Chicago, Ind.; secretary, Leo Goldner, Parker Steel Co., Toledo, O.; treasurer, S. D. Baron, Tyler Steel Corp., Toledo.

Material Handling Institute Inc., Pittsburgh, elected four directors. They are: M. L. Aitken, Robbins & Myers Inc., Springfield, O., Electric Hoist Product Section; D. H. Bitney, Union Steel Products Co., Albion, Mich., Industrial Metal Container Section; W. C. Stuebing Jr., Lift Trucks Inc., Cincinnati, Powerized Hand Lift Truck Section; H. A. Carter, Geneva Metal Wheel Co., Geneva, O., Wheel & Caster Product Section.

Association of Lift Truck & Portable Elevator Manufacturers, Pittsburgh, elected C. E. Klumb, West Bend Equipment Corp., West Bend, Wis., president. G. G. Raymond Jr., Raymond Corp., Greene, N. Y., was elected vice president.

Stanley J. Asrael, Alexandria Junk Co., Alexandria, Va., was elected president of **National Federation of Independent Scrap Yard Dealers Inc.** Other officers are: First vice president, Aaron Goldstein, New Brunswick Iron & Steel Co., New Brunswick, N. J.; secretary, Sidney Rockmuller, Independent Scrap Iron & Metal Corp., Brooklyn, N. Y. David Reisner, William Reisner Corp., Clinton, Mass., continues as second vice president; Joseph Latorraca, Northern Iron & Steel Corp., Clifton, N. J., treasurer.

NEW ADDRESSES

The Cleveland sales engineering staff of the **Fielden Instrument Division, Robertshaw-Fulton Controls Co.**, Greensburg, Pa., moved to larger quarters at 6116 St. Clair Ave., Cleveland. H. N. Gilmore will head this staff.

Spring Division of Crucible Steel Co. of America moved its sales headquarters to the company's main office in Pittsburgh. W. K. Krepps has been named assistant to the general manager, Spring Division. R. C. Lawson succeeds Mr. Krepps as sales manager of the division.

Automatic Molding Machine Co. transferred its operations to its new plant at 3201 Exposition Place, Los Angeles 18, Calif.

William F. Horsch Co. moved its offices to 18136 Mack Ave., Grosse Pointe, Mich.

Avildsen Tools & Machines Inc., Chicago, will transfer its west coast operations on Jan. 2 to 600 W. Foothill Blvd., Glendora, Calif., 28 miles east of Los Angeles. The company, which has other plants in Chicago and New York, makes metal cutting tools.

Kuma Tool Co., a division of Production Tool Corp., moved to enlarged manufacturing facilities at 3845 S. Lowe Ave., Chicago 9, Ill.

REPRESENTATIVES

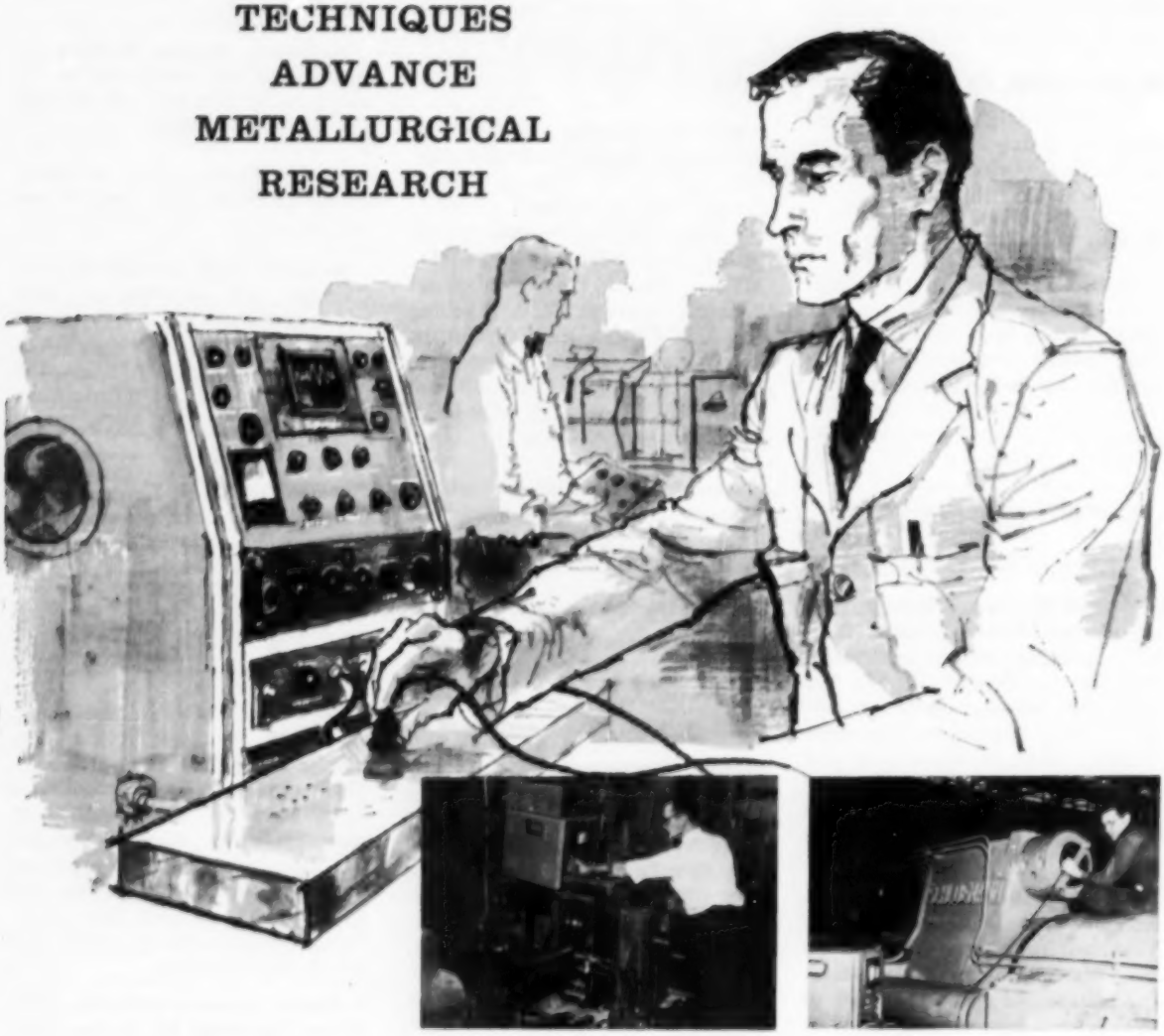
Hamilton Steel Warehouse, Cleveland, of Jones & Laughlin Steel Corp.'s Warehouse Division, Pittsburgh, has been appointed a distributor of aluminum mill products made by **Reynolds Metals Co.**, Louisville. Items in stock for immediate shipment include flat and coiled sheets, rods, bars, structurals, angles, tubing, plates and architectural shapes.

Revere Copper & Brass Inc., New York, appointed T. Watson Outwater as a special representative in Charlotte, N. C. He will handle Revere's welded steel tubing and forging lines and other manufactured products.

Lynd-Farquhar Co., Boston, has been named New England dealer for presses manufactured by the **Hamilton Division**, Hamilton, O., of **Baldwin-Lima-Hamilton Corp.**, Philadelphia.

Crowell Tube Co. Inc., Lexington, Mass., manufacturer of precision tubing, appointed these sales representatives: J. W. Southcombe, Cincinnati; J. J. Lambert Co., Buffalo; T. A. Harper, Maplewood, N. J.; D. H. MacLean, Simsbury, Conn.

HOW MODERN INSPECTION TECHNIQUES ADVANCE METALLURGICAL RESEARCH



Automatic Ultrasonic Inspection of continuously produced steel strip and welded tube is one of the most recent Reflectoscope inspection techniques brought from laboratory to production line.

Regular Maintenance Inspection of production equipment, like this extrusion press, is a valuable extra duty which many owners assign to their Reflectoscope when the instrument is not required for lab and production tests.

Sperry Ultrasonic Reflectoscopes are found in the modern metallurgical laboratories of leaders in the metals industry. The Ultrasonic UW Reflectoscope is a new research tool that has proved its reliability and usefulness in the search for closer quality control . . . for new and better materials. Ultrasonic waves probe deep inside steel . . . nonferrous metals . . . ceramics . . . plastics — revealing even the smallest flaws and hidden internal defects.

The Reflectoscope not only locates these flaws—it also determines their approximate size! In addition, it can even be used to determine elastic properties.

Does your laboratory have the latest, most efficient ultrasonic research equipment? Write today for complete information on the Sperry Ultrasonic Reflectoscope—a reliable testing method for most metals!

SPERRY PRODUCTS, INC.

602 Shelter Rock Road Danbury, Connecticut

STEEL
December 31, 1956

Technical Outlook

BROWN ORE BENEFITS— Richard E. Perry, research engineer with the U.S. Bureau of Mines at the University of Alabama, has patented a flotation process to beneficiate low-grade brown iron ores or limonites. Perry says his idea effectively separates the ore from its impurities—sands, clays or other minerals. In the process, the ore is coated with a film of petroleum oil and tall oil (a waste product of the paper pulp industry). This helps the ore float while the impurities sink to the bottom of a special machine. The iron oxide is skimmed from the top of the bath.

ALUMINUM SKIN— Westinghouse engineers are coating copper wire with a thin skin of aluminum and adding a coating of high-temperature insulation. Result: An enameled aluminum-clad copper wire that combines the high electrical conductivity of copper, the superior oxidation resistance of aluminum and the added protection of insulating enamel. The product will permit the operation of electrical equipment over long periods in the region of 500°F.

SPINNING TITANIUM— By spinning titanium into a cylinder head shape, Lukens Steel Co., Coatesville, Pa., has broken a cost-barrier to the use of titanium in chemical and process industries. Previously, titanium heads were made with dies. The elliptical head (16 in. in diameter, ¼-in. thick) was spun from a Rem-Cru A-55 plate at 600°F.

ACCORDION TRAILER— An aluminum trailer with an inside area of 780 sq ft (enough to seat more than 125 men) folds up to the size of an ordinary "semi" when it goes on the road. Sides telescope inward, floors fold up accordian style. Possible uses: Service vehicle for the armed forces, housing for traveling industrial exhibit, mobile homes. More than 12 tons of Alcoa aluminum sheets, extrusions, plates and castings went into the trailer which was built by Gerstenslager Co., Wooster, O.

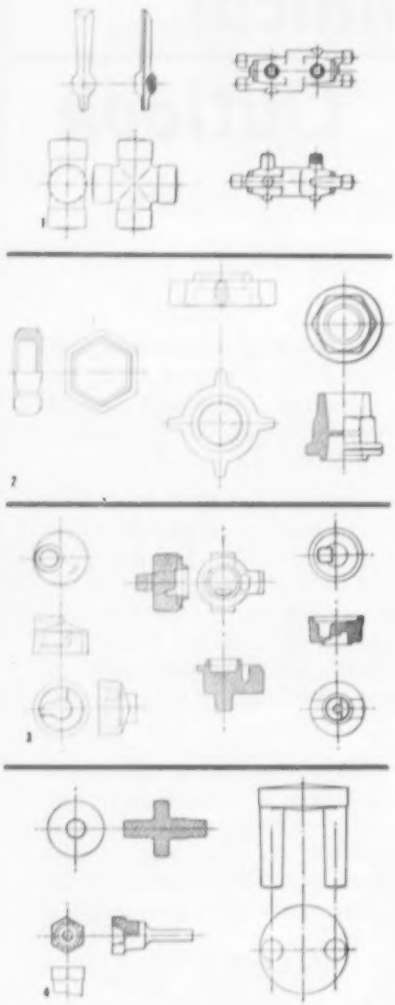
DRIER AIR— Press and stamping plants of General Motors Corp., Chrysler Corp. and Ford Motor Co. protect their pneumatic tools by dehumidifying the air. This decreases tool maintenance and increases tool longevity; it also prevents rusting. Refrigeration systems made by Worthington Corp., Harrison, N. J., do the job.

DETECTING PORES— The National Bureau of Standards has developed a nondestructive procedure to determine the size and position of pores in electroplates. On x-ray film, a pore shows up as a black spot. Discontinuities in the base metal are determined by radiographing it before plating.

ADHESIVE TEST— The Air Force is developing an ultrasonic device called the "Stub-Meter" to test structural adhesive bonds. It relies on the vibration behavior of a ferroelectric transducer, which indicates the structural properties of bonded specimens that are coupled to it. The principles of its construction are summarized in a report released by the Office of Technical Services, U.S. Department of Commerce.

RECORD FURNACE— A 600-ton open hearth, the largest yet, began operating a few days before Christmas at Weirton Steel Co., Weirton, W. Va. The 109 x 27 ft monster has a hearth area of 1485 sq ft. Heat input is rated at 150 million Btu an hour. Heat time is expected to average less than 15 hours, including 3½-hours for charging (through seven doors). In terms of finished steel, each heat will be the equivalent of 300 automobiles.

Metalworking Outlook—p. 21 Market Outlook—p. 77



Commercial Tolerances for Hot

FORGING TYPES:	COPPER	MUNTZ METAL	FORGING BRASS
1. SOLID	0.010	0.008	0.008
2. SOLID with symmetrical cavity	0.010	0.008	0.008
3. SOLID with eccentric cavity	0.012	0.008	0.008
4. SOLID deep extrusion	0.012	0.010	0.010
5. HOLLOW deep extrusion	0.012	0.010	0.010
6. THIN SECTION, SHORT (Up to 6 in. incl.)	0.012	0.010	0.010
7. THIN SECTION, LONG (Over 6 in. to 14 in. incl.)	0.015	0.015	0.015
8. THIN SECTION, ROUND	0.012	0.010	0.010
Machining allowance (On one surface)	1/32	1/32	1/32
Flatness (Maximum deviation per inch)	0.005	0.005	0.005
Concentricity (Total indicator reading)	0.030	0.020	0.020
Nominal web thickness	5/32	1/8	1/8
Tolerance	1/64	1/64	1/64
Nominal filler & radius	3/32	1/16	1/16
Tolerance	1/64	1/64	1/64
Approximate flash thickness	1/16	3/64	3/64

What Copper Alloy Forgings Can Do

By ARTHUR I. HEIM
Research Engineer
Copper & Brass Research Assn.
New York, N. Y.

IN THE copper industry, the term "forging" usually means hot forging in closed-die or impression-die presses. Few copper-base alloys are drop forged or open hammer forged.

Copper-alloy forgings offer the designer and production engineer many advantages. Compared with sand castings, equal or greater strength at lower unit weight is possible. High tensile strength and fatigue resistance result from the uniform, dense grain structure.

Doubly Worked—Added strength comes from "double hot working." Many forgings are made from rolled or extruded stock in which the fibers run longitudinally. Such stock is further improved by forging where a compacting and refinement of grain occurs.

Tensile strengths ranging from 30,000 to 85,000 psi can be achieved, depending on the alloy selected. Alloys are available for specialized problems which standard alloys cannot solve.

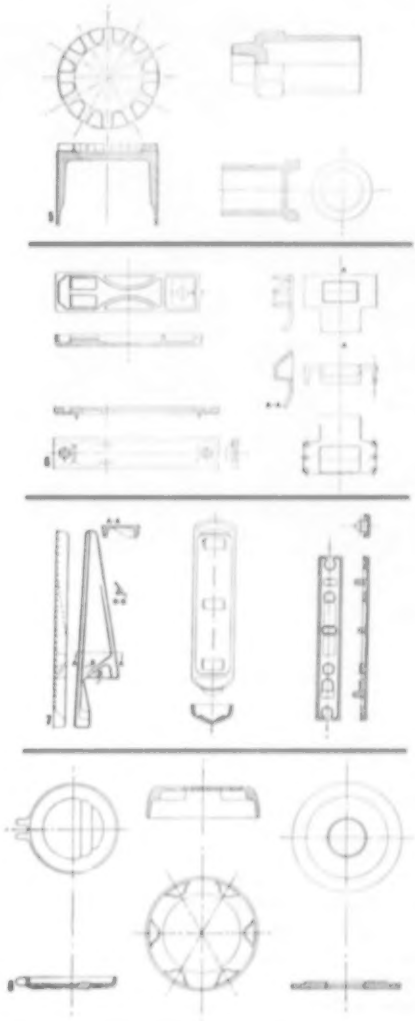
Die Savings — Dies are commonly made in two parts, bolted and keyed to the moving gate and to the bolster. Accurate registration between them is frequently achieved by pins.

Considerable economy can be

Pressed Copper Alloy Forgings

NAVAL BRASS	LEADED NAVAL BRASS	MANGANESE BRONZE	HIGH SILICON BRONZE	ALUMINUM SILICON BRONZE	NICKEL SILVER 45-10
0.008	0.008	0.008	0.012	0.010	0.008
0.008	0.008	0.008	0.012	0.010	0.008
0.008	0.008	0.008	0.012	0.012	0.008
0.010	0.010	0.010	0.014	0.012	0.010
0.010	0.010	0.010	0.014	0.012	0.010
0.010	0.010	0.010	0.014	0.012	0.010
0.015	0.015	0.015	0.020	0.015	0.015
0.010	0.010	0.010	0.014	0.012	0.010
1/32	1/32	1/32	1/32	1/32	1/32
0.005	0.005	0.005	0.005	0.005	0.005
0.020	0.020	0.020	0.030	0.030	0.030
1/8	1/8	1/8	3/16	5/32	1/8
1/64	1/64	1/64	1/64	1/64	1/64
1/16	1/16	1/16	1/8	3/32	1/16
1/64	1/64	1/64	1/64	1/64	1/64
3/64	3/64	3/64	5/64	1/16	3/64

*All tolerances are given in inches, plus and minus, and apply to forgings weighing up to 2 lb. For tolerances of forgings weighing more than 2 lb, consult producers.



Tensile strength, pressure tightness and excellent corrosion resistance are good reasons for taking a considered look at these products

realized by using die blocks made of the common, inexpensive steels while the dies, inserted in and supported by the die blocks, are of more costly special alloy steel. When properly designed, these lighter dies can be relied on to produce forgings with close tolerances.

Pre-Shaped — In press forging, the original slug is generally cut from rod. Severe or intricate deformation may make it necessary to substitute an extruded shape cut to length. The extruded shape can often partially conform to the final shape which will be imparted in the die.

Plastic metal flow at elevated temperature under the pressure of forging causes the grain direction to conform to the contours of the piece and parallel to the direction of the highest stresses. This increases the inherent strength of the part and permits the design of smaller, thinner sections which save metal and reduce weight.

Tolerances — Close tolerances will often eliminate machining to size or limit it to light finishing cuts. Forgings up to 2 lb leave the die within 0.008 to 0.015-in. of size, with smooth texture surfaces. For outside and inside draft angles of 1 to 5 degrees, a $\pm\frac{1}{2}$ degree tolerance is standard.

The table above shows commercial dimensional tolerances to be expected from hot-pressed, copper-base forging alloys. For forgings over 2 lb, the producer should be consulted. These tolerances compare favorably with copper-alloy sand castings where $\pm$0.03-in. is considered good practice.

Tooling — The economy of di-

Properties of Hot Pressed Copper Alloy Forgings

Alloy	Composition Per Cent	Average Forging Temperature °F	Relative Forgeability (forging brass =100)	Machinability (free cutting brass rod=100)	Tensile Strength Psi (0.505-in. test section)	Yield Strength Psi* (0.505-in. test section)	Elongation per cent in 2 in. (0.505-in. test section)
Copper	Cu 99.90 min	1500	65	20	33,000	11,000	45
Muntz Metal	Cu 59.0-63.0 Zn remainder	1400	90	40	58,000	21,000	48
Forging Brass	Cu 58.5-62.0 Pb 1.50-2.50 Zn remainder	1400	100	80	58,000	23,000	40
Naval Brass	Cu 59.0-62.0 Sn 0.50-1.00 Zn remainder	1400	90	30	64,000	26,000	40
Leaded Naval Brass	Cu 59.0-62.0 Sn 0.50-1.00 Pb 1.25-2.25 Zn remainder	1400	90	70	62,000	24,000	40
Manganese Bronze	Cu 57.0-60.0 Sn 0.50-1.50 Fe 0.80-2.00 Mn 0.50 max Zn remainder	1400	80	30	72,000	34,000	33
High Silicon Bronze	Cu 94.8 min Si 2.75-3.50	1600	40	15	52,000	18,000	70
Aluminum Silicon Bronze (nominal)	Cu 91.0 Al 7.0 Si 2.0	1500	75	55	83,000	41,000	35
Nickel Silver (45-10)	Cu 44.0-46.0 Ni 9.0-11.0 Zn remainder	1400	85	40	83,000	36,000	25

*0.5 per cent extension under load

mensional accuracy is evident in trouble-free use of jigs, fixtures and holding equipment for secondary operations. Ease of chucking makes these forgings ideally suited to machining on high speed automatic machines and automated production lines.

Tools will last about three times as long without grinding as tools used on castings because forgings are free from scale, burned-in sand and hard spots. There are no blowhole rejects.

Sharply defined lettering and numerals (depressed or in relief) can be produced. The as-forged appearance is attractive, so parts can be used as is or can be enhanced by plating, lacquering or enameling with a minimum of preparation.

Die Life—In general, hot forging of copper-base alloys permits runs of 12,000 to 40,000 pieces. A simple closed die can turn out 30,000 to 40,000 pieces before tooling must be renewed. If a punch is surrounded by metal, as in certain extrusion dies, a run of 12,000 to 15,000 can be expected. In forging a booster fuse in a three-part die, the bottom die was serviceable for 40,000 pieces, the surrounding die for 30,000 and the punch for 15,000.

As a rule, the higher the copper content, the fewer the pieces that can be produced before tooling must be renewed. When multiple cavity dies can be used, the number of forgings produced from one die is increased proportionately.

Design — Initially, forging dies cost more than pattern equipment for sand castings, and unless the quantity is substantial, forging may not be warranted. A sand cast or machined part should not be considered for forging until the design has been carefully reviewed. It is important that the item be specifically designed for forging.

All the design simplification possible should be incorporated into the part, taking into account such considerations as weight reduction owing to additional strength and improved grain structure, elimination of unnecessary machining, tolerances and draft angles.

Factors—When considering the alloy to be used, review:

Tensile Strength
Yield Strength
Forgeability
Hardness
Corrosion Resistance
Conductivity (thermal and electrical)
Machinability
Joinability (soldering, brazing, welding)
Surface Finish (natural or applied)

The alloy will depend upon the requirements the design must meet. Several offer outstanding properties: High electrical conductivity for current carrying members; exceptional corrosion resistance for marine applications, or outdoor service such as pole line hardware; and leaded alloys that make possible high speed, economical machining operations.

Resistance—The inherent corrosion resistance of copper-base alloys to salt water, atmospheric gases and many types of liquid and gaseous reagents gives them long life under severe operating conditions. The dense, homogeneous cross section makes them a natural answer in plumbing, refrigeration, chemical and food processing industries which require pressure tightness and corrosion resistance.

The Chlorine Institute approves forged valves and fittings of naval brass to handle highly reactive chlorine gas. Chemical manufacturers specify similar copper-base alloys for equipment subjected to the action of compounds which combine readily with other metals. Waterworks and sewage plants specify silicon-bronze parts in key locations.

Refrigerator manufacturers make wide use of copper-base forged fittings because of their excellent resistance to corrosion caused by condensed moisture and the action of the refrigerant. Chromium plated accessories, such as handles and hinges, retain their luster because the alloy provides an excellent base for a lasting bond. A large manufacturer of refrigerant control valves found these forgings eliminated porosity. He has eliminated pressure testing, which was required with sand castings.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

Answers from the analog computer, foreground, are printed on a strip of paper by a recorder made by Brush Electronics Co., a division of Clevite Corp., Cleveland

Computers Speed Design

THE dress rehearsal is a job that has been taken over by computers at Reliance Electric & Engineering Co., Cleveland.

Complicated drive systems, including motors, controls, regulators, gears and the driven machine, are expressed in analogs and fed into the computer to see if the design will work.

To solve these closed-loop systems, the dynamic behavior of all components must be taken into account.

A mathematical solution requires working with fifth and sixth order differential equations and a large number of equations involving variables.

Time Saving — Problems which took a trained mathematician three months to solve are done on the analog computer in 2 to 3 hours. Reliance recently added an Alwac III digital computer, made by Logistics Research Inc., Redondo Beach, Calif. In 10 minutes, it does calculations which take engineers 8 or more hours.

The increase in speed and accuracy enables Reliance engineers to do a more thorough job of designing. They can make more calculations and use improved design formulas which correlate more closely with test results.

Problem Solving — An analog computer study was used to determine the best drive for a wire drawing machine. From four systems, the computer selected the one with the best over-all characteristics of transient response, system stability and response to the error introduced in step function. The design selected is mechanically and electrically capable of drawing wire at more than 4000 fpm.

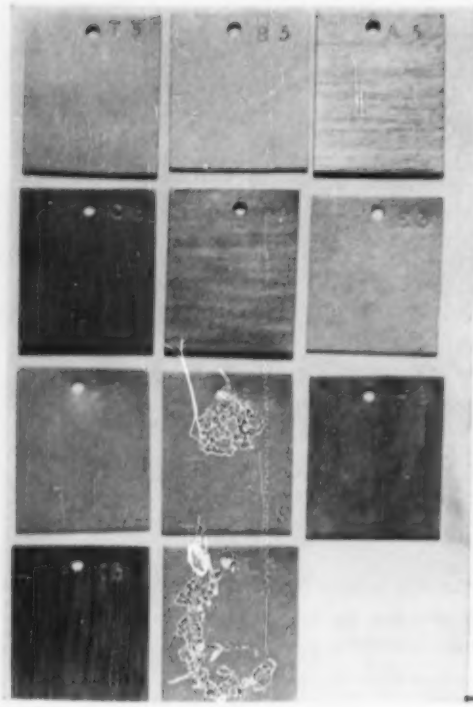
Since the beginning of this year, Reliance has used the digital computer in the design of alternating current motors—for sales order design, negotiations and sales proposals and in NEMA redesign.

Input data in motor design consist of 79 items, including horsepower, speed, voltage, wye or delta connection, wire diameter, turns per coil, number of circuits, end ring area, number and size of stator and rotor slots, and unit costs.

An Extra—Computers make a big impression on engineers. They are encouraged to spend more time on design.

Reliance has found that engineering talent being developed at colleges has the ability to establish the complex procedures for computer analysis and the subsequent translation of answers. Technicians develop these skills rapidly.

Problems are fed into the operating controls of the Alwac III digital computer from the typewriter. The computer types its answers. Cabinets at right house the computer's power supply, logic unit and memory unit



Titanium coupons in accompanying illustrations are letter coded. This table lists the specifications before treatment

Code Letter	Grade	Condition	Gage (inches)	Scale Thickness (3)	Base Hydrogen
A	8 Mn	Hot Rolled	0.053	0.0018	70
B	C.P. (1)	Cold Rolled	0.028	0.0035	50
C	8 Mn	Cold Rolled	0.033	0.0027	55
D	5 Al-2½ Sn	Hot Rolled	0.046	0.0028	190
E	C.P. (1)	Hot Rolled	0.019	0.0022 (2)	350
F	C.P. (1)	Hot Rolled	0.019	0.001	340
G	C.P. (1)	Hot Rolled	0.024	0.0018 (2)	160
H	8 Mn	Hot Rolled	0.026	0.001	240
K	8 Mn	Hot Rolled	0.030	0.0016	105
L	C.P. (1)	Hot Rolled	0.030	0.0013	145
M	6A1-4V	Hot Rolled & Vacuum Annealed	0.025	0.0045 (2)	43
T	C.P. (1)	Hot Rolled	0.036	0.0028	55

(1) Commercial purity grade (70,000 psi).
(2) Variable.
(3) Scale thickness: Grams sq cm.

These titanium coupons were descaled and pickled, then held for 30 minutes in an 800°F bath. Compare these with the ones at right

Descaling Titanium Sheet

IF YOU form titanium sheet at high temperatures, consider the advantages of an oxidizing salt bath which removes tough, hard scale:

Descaling time at 800°F takes from 45 seconds to 10 minutes.

Base metal attack is quite low.

Hydrogen absorption is minute. And you can minimize firing tendencies if you keep the concentration of oxidizing agents above 8 per cent.

Although based on laboratory tests, the observations look promising for production applications. Commercially pure titanium, as well as its alloys, satisfactorily respond to the treatment.

Types—Acid is effective enough on thinner scales. But working a bar or billet into sheet form takes a comparatively long time—the scale becomes tough, hard, almost chemically inert. Fused salt baths seem to be the only answer for efficient removal.

By W. J. BARTH
Metallurgical Engineer
E. I. du Pont de Nemours & Co. Inc.
Newport, Del.

There are two types: Sodium hydride and oxidizing. Only oxidizing baths were used in testing this method. They contained various amounts of caustic soda, sodium nitrite and nitrate.

Commercial fabricators supplied the test coupons with the mill scale still intact. Here is how they were processed:

1. Cleaned in carbon tetrachloride. 2. Weighed and surface area measured. 3. Immersed for minimum descaling period. 4. Water quenched. 5. Pickled at room temperature in a dilute solution of nitric-hydrofluoric acid for 15 to 20 seconds. (This removes a gray film formed by the caustic bath.) 6. Weighed. 7. Sampled for hydrogen. 8. Reweighed and measured. 9. Immersed in bath for 15 or 30 minutes. 10. Repeated steps Nos. 4, 5, 6 and 7 to determine the metal attack.

Modified Baths—Straight caustic soda is too severe. It attacks the titanium quite rapidly. When iron wire was used to suspend the samples, it accelerated the attack.

The addition of oxidizing agents and salts slowed down the bath action, increasing the minimum descaling time and decreasing the metal attack. At low attack rates, no acceleration from iron-titanium coupling was observed.

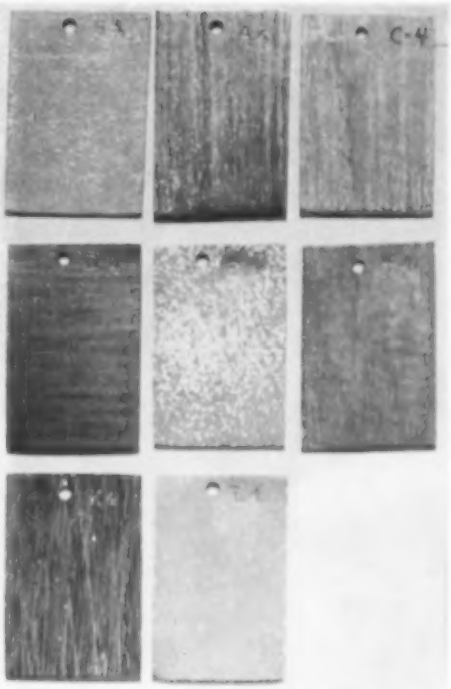
Especially at 1000°F, nodules can be formed (they seem to be titanium dioxide). High concentrations of oxidizing agents are probably responsible. We tried adding some phosphates and sulphates and only succeeded in softening the nodules and making them less adherent. The best answer seems to be: Avoid temperatures over 800°F. Bath chemistry

Here's how titanium samples fared in one of the better baths (80 $NaOH$-5$NaNO_3$-5$NaNO_2$-10$NaCl$). Coupons were held by iron wire

	800°F			900°F		
Code	Descaling Time (Minutes)	Weight Loss (2)	Hydrogen Pick-up	Descaling Time (Minutes)	Weight Loss (2)	Hydrogen Pick-up
A	3¼	0.0043	−11	2	0.0066	10
B	10⅓	0.0039	− 6	3¾	0.0082	
C	5¼	0.0038	− 8	2⅓	0.0065	5
D	5	0.0036	−15	3¼	0.0059	0
E	3 to 4 (1)	0.0051	10	2⅓	0.013	120
F	3¼	0.0052	10			
G	3 to 3¾ (1)	0.0053	15			
H	¾	0.0039	10	1/3	0.0049	10
K	1¼	0.0044	20	⅓	0.0060	15
L	1⅓	0.0047	− 5	¾	0.010	20
M	5-8	0.0026	+ 1	2-3	0.013	+30
T	5⅓	0.0039	− 4			

(1) Variable scale thickness.
(2) Grams sq cm.
(3) Time: 30 minutes, all samples.

Processing of these coupons was the same as those shown left, except bath was at 900°F. See tables above for letter code explanation



By modifying an oxidizing fused caustic bath, you can remove the tough, inert scale on titanium with less danger of firing, says the author. Hydrogen absorption remains low at 800°F

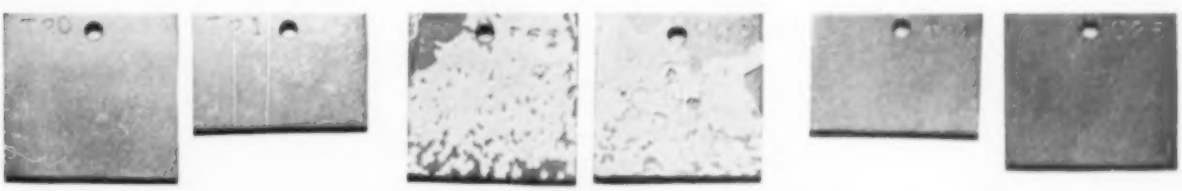
changes at 1100°F. No nodules form. In the tests, nodules didn't form after 30 minutes at 800°F; it took 10 to 15 minutes for them to form at 900°F.

Modifiers—It may be that sheet firing is promoted in oxidizing caustic baths through depletion of oxidizing agents. Chrome and nickel didn't cause firing, although chrome may be an indirect offender. Agitation also promotes firing.

Sheet Firing — Industries frequently use the same bath for stainless steel, so we added small amounts of chromium and nickel to test their effect on firing. Chromium dissolves readily, but nickel is almost insoluble (less than 0.002 per cent at 1000°F). A 5 per cent addition of chrome had no effect. In no case did the samples show any evidence of firing.

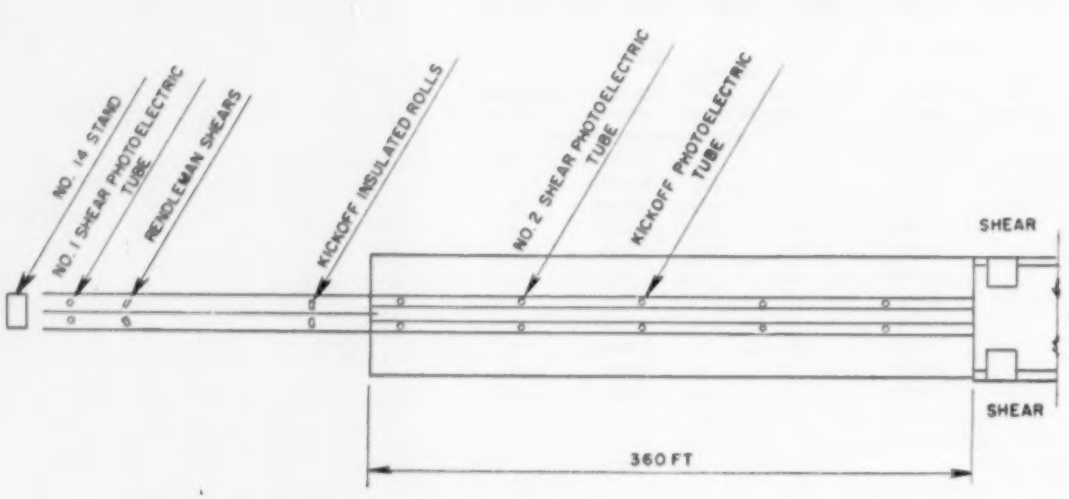
While the tables show that 900°F will descale sheet, based on the laboratory work, 800°F is a better working temperature.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.



900°F 1000°F 1100°F

Coupons after 15 minutes at temperatures shown. (Bath 60$NaOH$-10$NaNO_3$-10$NaNO_2$-20Na_3PO_4) Nodule formation is one reason 800°F appears best



This is a schematic layout of Bethlehem Pacific's 10-in. mill. Photoelectric tubes are also used ahead of each stand to control the repeater operation

Photoelectric Cells Speed Mill Production

With the right electronic system, you can control the length of bars, rods and other mill products with great accuracy. Water cooling brings control cells like these into rolling picture

YOU can get better control of shear, kickoff and lift repeater operations in bar and rod mills with photoelectric tubes.

W. L. Hanson, assistant superintendent, Bethlehem Pacific Coast Steel Corp., Los Angeles, told the American Iron & Steel Institute at San Francisco last month that controls based on such tubes are playing an important role in production improvement at his plant.

Highlights of the system he described include:

1. Reduction of errors in sheared lengths from 10 ft to 1 ft per 300 ft length.

2. Elimination of the time lost by the shearman in lining up the front ends of bars prior to final shearing.

3. Almost virtual elimination of the gap time between bars at the repeaters.

Equipment—The Los Angeles mill is a 21-stand, 10-in. combination rod and bar mill. It produces a wide variety of sections from 600-lb billets which are 2½-in. square and 30 ft long. They are heated in a side charge-discharge furnace with gas or oil. It is equipped with priming and soaking zones.

The mill is driven by nine adjustable direct current motors. It's a double strand type—rods are delivered to laying reels and reinforcing bars are rolled double.

The main controlling problem has centered in these three auxiliaries: 1. Two rotary, disc-type shears. 2. Kick-offs on each side of the hot bed. 3. 180-degree lift repeaters.

Here is how photoelectric tubes are used to control the shearing operation.

Method—The shears are 116 ft from the end of the hot bed and consist of two pairs of rotating knife-edged discs, one pair for each runout conveyor. A solenoid-controlled, hydraulically operated spout directs the bar into the shear.

The original method for controlling the shears was an insulated roll-timer. An insulated roll is one or more rolls in the conveyor which acts like a switch, closing the circuit between the roll and ground (a noninsulated roll).

The shear control circuit had such a roll in the conveyor line immediately in front of the 10-in. hot bed (illustration above). The nose of the bar hit this roll, actuating the control, and the spout

DESIGNERS and BUILDERS of Complete STEEL PLANTS

MESTA

THERE IS NONE BETTER

MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA

guided the bar into the shear. A timer measured bar length.

The system had a flaw. Any adjustment of mill speed or fluctuation in the voltage supply to the shear control would result in errors ranging up to 3 per cent.

Today—The shear spout is now actuated when the nose of the bar passes under a water-cooled photoelectric tube on the hot bed. It's accurate to within 0.3 per cent. The tubes may be moved to any position along the hot bed. A calibrated timer in the circuit facilitates minor adjustments in length due to mill tolerance changes or variable billet weights.

The basic parts of the operation are the two No. 1 shear photoelectric tubes, the shears and the two No. 2 shear photoelectric tubes. As the bar leaves No. 14 stand (illustration, p. 64), it is directed to either side of the hot bed. When the front of the bar passes under No. 1 shear photoelectric tube, the panel operation is started. The shear-spout solenoid is actuated after the bar continues down the hot bed and actuates the No. 2 shear photoelectric tube. When the solenoid operation is completed and the bar is cut, a hold-in relay prevents further operation of the solenoid contactor until the bar is clear of either No. 1 or No. 2 photo tubes. The tube then returns the panel to normal, and it is ready for the next operation.

Repeaters — A skillful arrangement of mill procedure has reduced the 26-ft gap which used to be necessary between bars passing through the repeaters between mill stands.

Repeaters, under the new arrangement, are normally in the down position. The bar travels around the repeater and actuates a photoelectric cell as it enters the next stand. The repeater rises and releases the loop for control by the operator.

As the end of the bar approaches, a timing device automatically lowers the repeater. The operator anticipates the action by shortening the loop so the repeater won't drop onto the bar. With the repeater in the down position, it's ready for the bar following. Only a small gap is left between bars to operate the photocells.

Builders Bullish Toward 1957

Widespread plans for expansion and stabilization of government market spell good machine tool business through next year. Shipments will hit $885 million

" . . . the outlook for good business was never better for U.S. machine tool builders than right now," says J. A. Raterman

MACHINE TOOL shipments in 1957 will at least equal, may surpass, the $885 million now estimated for 1956. As predicted by STEEL (Jan. 16, p. 37) '56 shipments were pegged high to prevent excessive delivery delays.

The same will hold true for 1957, says Jerome A. Raterman, president, National Machine Tool Builders' Association and president, Monarch Machine Tool Co., Sidney, O. The industry enters the new year with a seven-month backlog.

Boom, Boom—Absence of the "bust" part of the industry's fabled business cycle will continue. "Added stabilization is in prospect," Mr. Raterman assures, "as the result of a new government policy directed toward a systematic program of modernization of machine tools operated by the Army, Navy and Air Force. Each of the military services will replace a definite percentage of its present machines with new equipment on a yearly basis.

"Not a little of the machine tool industry's satisfaction with the showing of the last 12 months stems from the fact that 85 per cent of the 1956 total shipments represent domestic peacetime business. Rated defense orders amounted to only 7 per cent. Foreign shipments accounted for the remaining 8 per cent."

Never Better—"Altogether," he continues, "the outlook for uninterrupted good business for some time to come was never better for U.S. machine tool builders than it is right now. Interest by small as well as large industrial concerns in programs of plant expansion, as well as equipment modernization, continues unabated.

"So great, in fact, is the pressure for speedier deliveries of many types of machine tools that expansion of production facilities by some machine tool builders themselves is already under way or contemplated for early in the new year."

Bullard Buys Hydra-Feed

E. C. Bullard, president, Bullard Co., Bridgeport, Conn., announces that his company has purchased the Hydra-Feed line of automatic and tracer-controlled lathes from Hydra-Feed Machine Tool Corp., South Norwalk, Conn. The transaction was for an undisclosed cash sum.

Bullard has acquired all the assets and business of Hydra-Feed relating to its lathes, including designs and patents. According to Mr. Bullard, the lathes will broaden the market base for Bullard. They will be made in Bridgeport. Sales will be handled by the company sales force.

Hydra-Feed has terminated all its machine tool activities and will liquidate in 1957.

It couldn't be done...

So they did it...in 2 blows

KEYSTONE XL WIRE STUDY

Great Lakes Screw Corporation

and KEYSTONE XL Heading Wire

"We want a door hinge bolt that won't break off in a collision—that we can drive faster—that's cheaper, yet higher in quality," said the automotive engineers.

"Can do," replied Great Lakes Screw Corporation, Chicago, Illinois.

This required an exceptional flow of material in both blows—the first blow cones the head, the second drives in the recess and mushrooms the head to specification. Tough assignment? Not with Keystone "XL" Heading Wire! Because of "XL's" consistent *flowability* and unvarying uniformity, Great Lakes makes long runs of these cold headed parts, producing them precisely on schedule with a minimum of rejects.

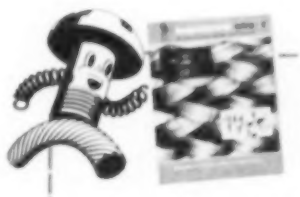
If you, like Great Lakes Screw Corporation, have difficult heading operations, we invite you to call your Keystone representative.

Our service includes close counsel and analysis of your wire requirements. Tell us how we can serve you.

Keystone Steel & Wire Company, Peoria 7, Illinois

KEYSTONE

WIRE FOR INDUSTRY



KEYSTONE STEEL & WIRE COMPANY
Peoria 7, Illinois

Mail coupon for free booklet—*COLD HEADING FACTS!* Discusses methods, technical facts, wire requirements and other data.

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MCA Columbium *and* research

A challenge for the metal industry

Research in metals is today the most extensive and rewarding in history. The challenge of this fast moving jet age and the unfolding of atomic power has presented demands far surpassing previous metallurgical requirements.

In contrast with the diminishing supply of some alloying elements, previously-scarce Columbium is now, and will be in the fore-seeable future available in great abundance. Here is an element that has scarcely been investigated, yet its physical properties offer great metallurgical advantages. It already is used in high-temperature and anti-corrosion applications. It also shows promise in the heat-treated common steels for added impact and transverse strengths. Tool steels used for long production runs may be aided by Columbium.

The unlocking of further knowledge in the use of Columbium is an opportunity which will prove most rewarding to alert metallurgists. For further details and technical application data write today.

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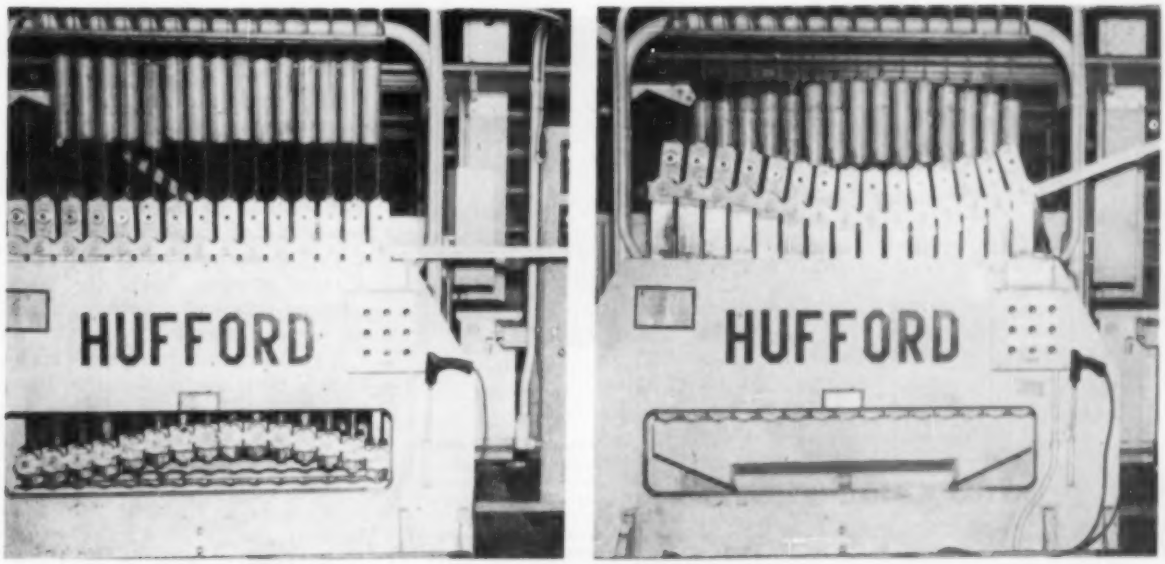
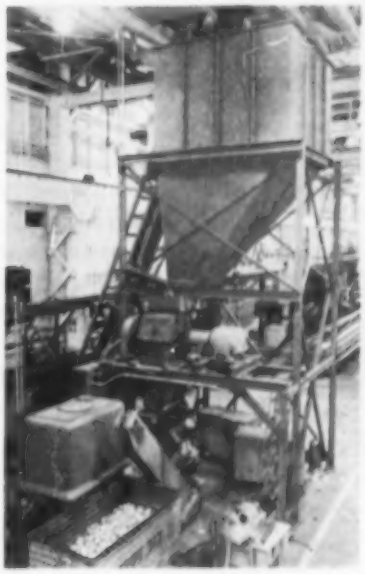


Spar cap in position for forming (left) and after forming (right). Black handled probe is used to insure proper forming temperature

Forming Matches Mill Output

High volume production of aircraft spar caps on the long Farnham mill at Douglas Aircraft needs adequate planning and forming equipment for best efficiency



Briquetting operation takes only 20 ft sq. Chips carried automatically from Farnham mill (background) end up as neat briquettes (foreground)

THE KEY to the high speed precision needed to finish the spar caps at Douglas Aircraft Co., Los Angeles, is its setup of milling, bending and contouring machines. It includes the 308 ft, Farnham mill (see "Short Work on Long Mill," Sept. 26, 1955, STEEL, p. 118), a Hufford bending press, a straightening press and sand blasters.

The Farnham uses eight, gantry type carriages, each of which has two heads that are cam controlled. The flood of chips is washed down a flume, strained and elevated to a hopper. Feeders, crushers and a press turn the chips into neat briquettes for convenient removal and reclamation.

Process—Example: The spar cap forming process starts immediately after machining. Each piece is stretch formed and bent about 17 degrees by hot dies in a Hufford bending press. Bending temperature is recorded on a strip chart. Thermocouple probes are used to detect the temperature at the bending point.

Following bending, the parts are gaged and trimmed to length.

Some caps which require only a small amount of bending are processed in the SW condition at room temperature and air aged later to the ST condition.

Special—One of the spar caps is comparatively heavy. It is contoured hot on a special Hufford bending press, which is shown in the top illustrations.

Heat is applied along the full length of the contour by heater elements cast in platens. They are placed between each die insert which grips the part during contouring.

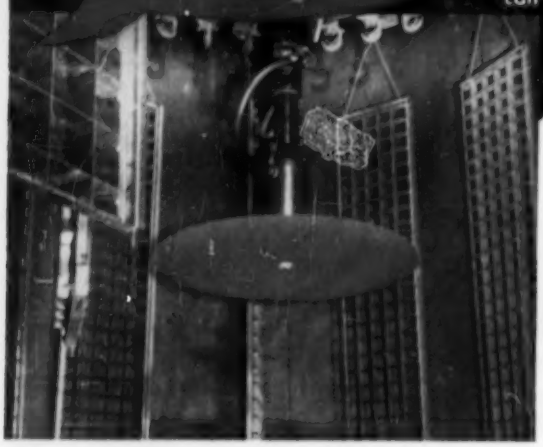
Heat treatment takes place in a 30x7x6 ft furnace. Two tracks hold six racks. The furnace will bring 6000 lb of aluminum and 1000 lb of racks to 250°F in 2 hours.

Spar caps are sandblasted automatically with a No. 80 grit prior to finishing operations.

What d'ya mean . . .

You're too little to use RANSBURG Electrostatic Spray Painting?

If your production justifies conveyorized painting, chances are RANSBURG NO. 2 PROCESS can do YOUR painting job better . . . at less cost.



RANSBURG NO. 2 PROCESS *accounts for a 50% savings in paint costs in finishing fluorescent lighting fixture parts for* MELROSE LIGHTING COMPANY, *Philadelphia. Melrose is a small plant employing only 25 people.*

Not only big industrial manufacturers like G. E. . . . Whirlpool-Seeger . . . Westinghouse and Republic Steel, but little plants, too, are using RANSBURG NO. 2 PROCESS in their finishing departments to help keep mounting manufacturing costs in line.

A typical example is Melrose Lighting Company, Philadelphia. They make industrial fluorescent lighting fixtures and employ only 25 people.

Formerly, according to F. Homer Hagaman, owner Melrose Lighting, when their fixture louvres were hand sprayed, they painted only 70 pieces per hour. Now, with Ransburg Electro-Spray, he reports they get over 200 per hour.

Production on the fixture end parts jumped from 400 pieces per hour by hand spray to over 2000 an hour electrostatically—a 400% increase!

Along with improving quality of the work, stepping up production, and cutting labor costs, Melrose is enjoying a 50% paint savings.

Let us show you how Ransburg No. 2 Process can lower YOUR painting costs. Write for our new No. 2 Process brochure on electrostatic spray painting. Numerous production-line examples show how other manufacturers are cutting finishing costs . . . increasing production . . . and improving the uniformity and quality of their work with Ransburg equipment.

Ransburg ELECTRO-COATING CORP.
Indianapolis 7, Indiana

RANSBURG

Looking at Stresses

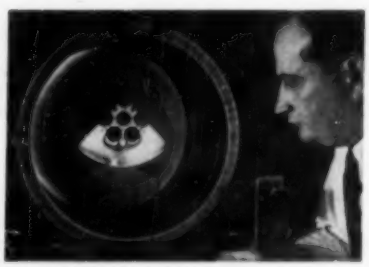
Plastic models of reactor pressure vessels help scientists see stresses in working units

SCIENTISTS at the Westinghouse Research Laboratories have found a way to see and study the complicated stresses inside the steel pressure vessel of a power-producing nuclear reactor.

A model of the structure is made from a photoelastic resin, or plastic. When loads are applied to the model, the material visibly shows twisting, bending and other stresses. Under polarized light, they appear as patterns of colored light.

Method—The model is about 2 ft high, 1½ ft in diameter and weighs about 100 lb. Air is pumped into it—about 4 psi is equal to the working pressure of the vessel (about 2000 psi).

The model is cured by heating, which "freezes" the stress patterns permanently. Samples are cut from it and examined under polarized light.



STRESS IN SAMPLE
. . . shows up under polarized light

Studies — The pressure vessels are of the "pressurized water" type. In the reactor, water is pumped through the vessel, where it acts as moderator for the uranium fission process and removes the vast quantities of heat the process releases.

To make the water hot enough to produce superheated steam, it must be kept in a sealed system under pressures up to 2000 psi. It is extremely difficult to calculate all the stresses these pressures create in the complex structure of a pressure vessel.

This work will help speed vessel design and insure that this structure can withstand high pressures.

Barrel Submerges Completely During Plating

This Mercil-type plating cylinder is driven by a cogged V-belt which eliminates the use of a series of gears. There are no moving parts on the cylinder.

Plating speeds are increased and a thorough plating action is insured by the total barrel immersion.

Double flexible dangler contacts are used with the barrel. They carry current into the cylinder through both ends and increase plating capacity. Cylinder hangers are insulated.

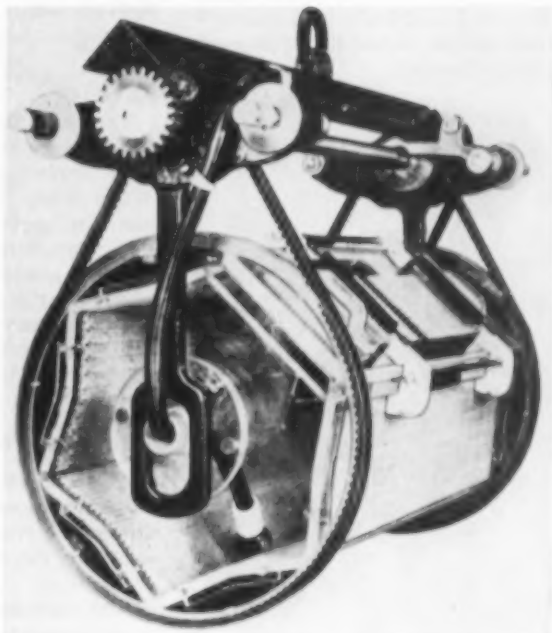
Dangler contacts have a removable control knob which is protected from hitting the panel section by a rubber bumper.

The cylinder is bussed to carry 1000 amperes.

Stainless steel pins in the driving pulley provide positive cylinder rotation. A spring-type cover clamp assures solid clamping and a tight cover.

The cylinder is available in Plexiglas, Melamine and Tempron.

Plexiglas cylinders are molded in one piece and are ribless. Convex inside tumbling surfaces strengthen the cylinder and facilitate tumbling. Melamine and Tempron cylinders are of rib-type construction. *Write*: Hanson-Van Winkle-Munning Co., Church St., Matawan, N. J. *Phone*: Matawan 1-1000



Screw Machine Has Spindle Speeds Up to 10,000 Rpm

Two versions of the model No. 00 automatic screw machine are for the jobs which are done advantageously without reversing the machine spindle.

Type 1 has a turret, vertical slide and nonreversing spindle. It is designed for drilling, reaming, facing, turning, forming, knurling and cutoff.

Type 2 replaces the turret with a one-tool position slide and omits the vertical slide. It is best for form and cutoff work.

Both machines take stock with a diameter of ½-in. High spindle speeds increase efficiency when free-machining material is used. Speeds down to 630 rpm are provided for efficient operation with tougher alloys. There are 18 spindle speeds.

A positive stopping device can be set to automatically stop the driveshaft when the last piece in the bar is completed. A warning light shows when the machine is not producing.

The driveshaft runs at a constant speed of 120 or 240 rpm. Using 120 rpm, it takes from 1½ to 100 seconds to make one piece per cycle.

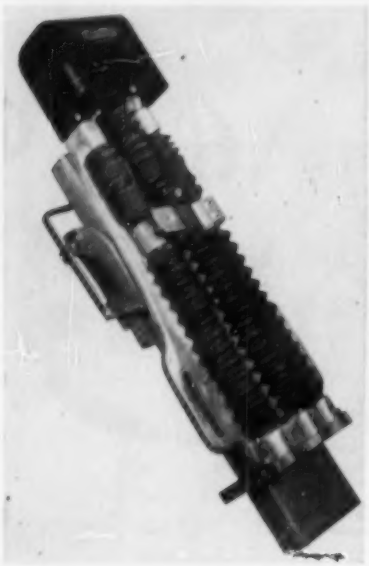
Faster rates are obtainable by designing cams and setting dogs to produce more than one piece per cycle. *Write*: Brown & Sharpe Mfg. Co., Providence 1, R. I. *Phone*: Dexter 1-5000

NEW PRODUCTS and equipment

Applicator

Model 1006 will apply 10 in. of buffing compound without resetting or adjustment.

The applicator can be installed on all types of buffing machines—from simple lathes to multioperation automatics.



The lightness of the applicator permits it to be installed on floating heads without disturbing their balance. It can be installed in any position without affecting operation.

Compound is applied only when needed. *Write*: George L. Nankervis Co., 15300 Fullerton Ave., Detroit 27, Mich. *Phone*: Vermont 8-5780

Towing Tractor

The maximum starting drawbar pull of this tractor is 8000 lb. It is powered by a six-cylinder Chrysler engine and has a fluid coupling drive which provides smooth starts.

The truck turns on a 146-in. radius. Maximum forward speed is governed at 16 mph. A helical-gear, synchromesh transmission provides four speeds forward and one reverse. *Write*: Industrial Truck Division, Clark Equipment Co., Battle Creek, Mich. *Phone*: Woodward 2-6561

Adhesive

Resin XV bonds metal name plates to wood, metal and ceramic surfaces.

The one-component, solvent-type adhesive is allowed to dry after it is applied to the name plate. When ready for application, the name is heated at 250 to 300°F, and while still hot, it is pressed firmly against the clean surface upon which it is to adhere. *Write*: Furane Plastics Inc., 4516 Brazil St., Los Angeles 39, Calif. *Phone*: Chapman 5-1153

Drill Sleeves

These tapered drill sleeves are made of nylon to eliminate drill breakage. When a drill hits a hard spot, the sleeve, not the drill, will break.

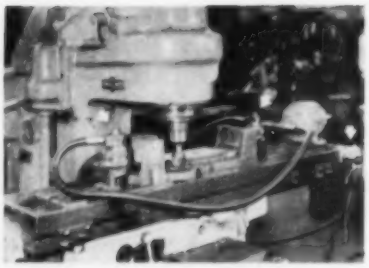
The Drill Saver is cured to give it hardness to withstand adverse conditions. It is not subject to damage by electrolytic corrosion or affected by coolants, oil, gasoline or grease.

The sleeve absorbs heavy shock and vibration. It will not score spindles. Sizes: 1-2, 2-3, 3-4. *Write*: James Products Co., 801 Mentor Ave., Mentor, O.

Setup Clamps

PowRlocks are air hydraulic clamps that automate fixtures. Their great clamping force eliminates chattering and increases the life of milling cutters and other tools.

Each system includes one to four clamping heads with matching T-slot nuts, air controls, an air hydraulic booster, a rapid return valve and all necessary air and hydraulic hoses. *Write*: Wilton Tool Mfg. Co. Inc., Schiller Park, Ill. *Phone*: Gladstone 5-6600



Chrome Plating

The Ripple Round is a lead alloy anode with a surface area 6.8 per cent greater than that of a conventional round anode. A deep ripple increases the surface area without changing anode size or weight.

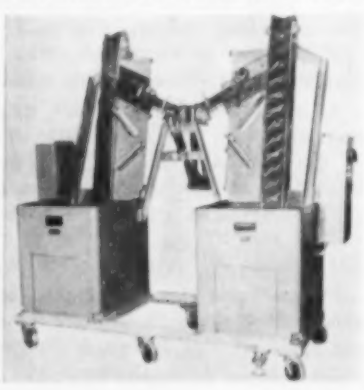
The anode provides ample cross section to handle high current densities without overheating. Warpage is eliminated because the electrodes run cooler and are more rigid than conventional types.

Six sizes of copper alloy hooks are provided. *Write*: Alpha Metals Inc., 56 Water St., Jersey City, N. J. *Phone*: Henderson 4-6778

Part Feeder

Two model 2200 feeders (one left and one right hand delivery) are mounted together, and their delivery chutes are combined to feed four streams of orientated parts at one time.

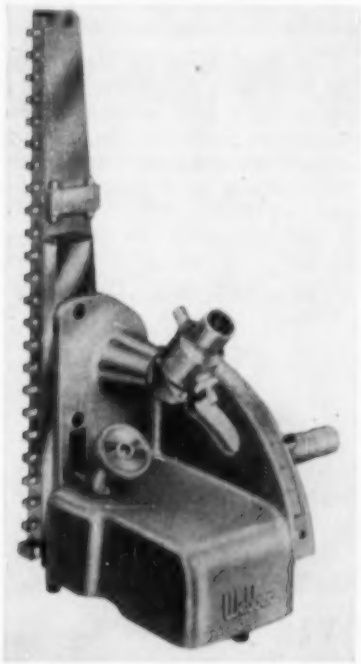
Each machine feeds parts into a delivery chute where they are subdivided into two chutes. Parts



of two different sizes are handled. *Write*: Feedall Inc., P.O. Box 47, Willoughby, O. *Phone*: Willoughby 2-8100

Optical Gage

Measurements of height accurate to ±0.000005 in. per inch can be made by the Micro-Accurate gage. It combines gage blocks and a Leitz measuring microscope to make the transfer of surface plate measurements easy.



Four models measure to heights of 25, 27, 49 and 61 in. *Write*: Webber Gage Co., 12912 Triskett Rd., Cleveland 11, O. *Phone*: Clearwater 1-1200

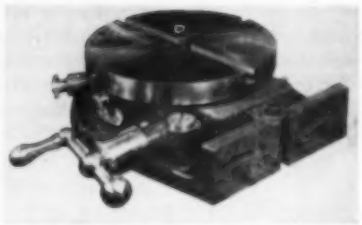
Rotary Table

Circular and rotary machining operations are simplified by the 12-in. rotary table. Its base permits both horizontal and vertical operation.

In the horizontal position, overall height is 5 in. Width is 14 in. Length is 15¼-in.

The dial is graduated in minutes and the table in degrees. One turn of the dial gives 4 degrees of circular motion of the table.

Center hole run out is guaranteed



to be no more than 0.0005 in., and parallelism through 360 degrees of rotation is guaranteed to 0.0001 in. *Write*: Universal Vise & Tool Co., Parma, Mich. *Phone*: 2-113

Rod Straightener

Core rods and gaggers are straightened as fast as they can be fed into this machine. It uses two heavy alloy steel dies, one movable and one stationary, to straighten one rod at a time.

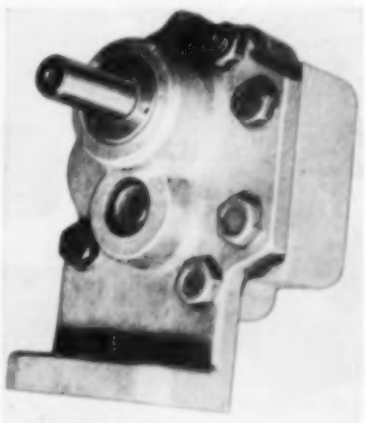
The dies close as a contracting square upon the work and straighten it by a blow delivered simultaneously on four sides. Big kinks in rods are first removed quickly in the bending jaws. One blow of the straightening dies does the rest.

After straightening, the rods can be sheared to the desired length on the machine.

Rods 3/8 to 2½-in. in diameter can be straightened and rods up to 1½ - in. in diameter can be sheared. *Write*: Wheelabrator Corp., Mishawaka, Ind. *Phone*: Blackburn 5-2141

Gear Pump

Fluid pressures up to 200 psi can be handled by this pump. Its design is adapted to engine oil pumps, primary pumps for fuel injection



systems, pumps for automatic transmissions, oil burners, low pressure machine tool mechanisms and manufacturing equipment of all kinds.

Output increases slightly as temperature rises. *Write*: New Products Corp., 3636 Oakton St., Skokie, Ill. *Phone*: Orchard 3-5873

Electric Hoist

The Wright Speedway features two speeds: Rapid lifting and lowering, and slow (one-quarter normal speed) positioning.

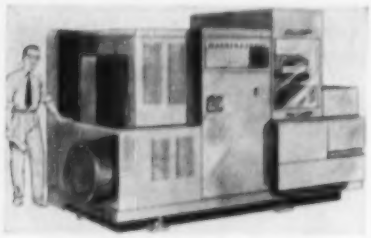
An automatic brake, which is immersed in an oil bath, assures uniform operation in varied atmospheres and safe holding while loads are suspended. Two adjustments of a setscrew compensate for break lining wear. *Write*: American Chain & Cable Co. Inc., 929 Connecticut Ave., Bridgeport 2, Conn. *Phone*: Edison 5-0161

Single Spindle Chucker

Large, complex workpieces can be machined quickly in one operation by the 3AC chucking automatic. It provides automatic regulation of spindle speeds, feed changes, cutting stroke length, turret indexing and front and rear cross slide operation.

Speed and feed changes can be

made under cut. Setups are made quickly. A simple placement of switch operating screws in the index control drum regulates the various machine functions. Setting easily adjusted trips on the machine's pentagonal control drum gives the desired feed rates, spindle speeds and cutting stroke lengths.



The machine swings 13½-in. over the cross slide and has a pentagon turret working stroke of 11 in.

There are 36 feeds ranging from 0.0019 to 0.124 in. The spindle has two speed ranges. Low is 30 to 385 rpm, high 65 to 826. Any six speeds and feeds may be selected for the machining cycle. *Write*: Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O. *Phone*: Henderson 1-5580

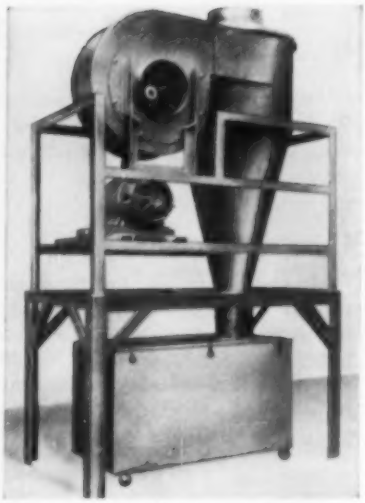
Floor Painting

Paint will not peel from concrete when you use Sure-Etch. It is brushed over the area to be painted. A bubbling process opens pores in the concrete in 30 seconds. After rinsing and drying, the floor is ready for painting.

The etch is recommended for plants with acid, alkali, oil, grease and other stubborn floor conditions that resist ordinary cleaning methods. *Write*: Colonial Refining & Chemical Co., 555 Industrial Blvd., Kansas City 15, Kans.

Dust Collector

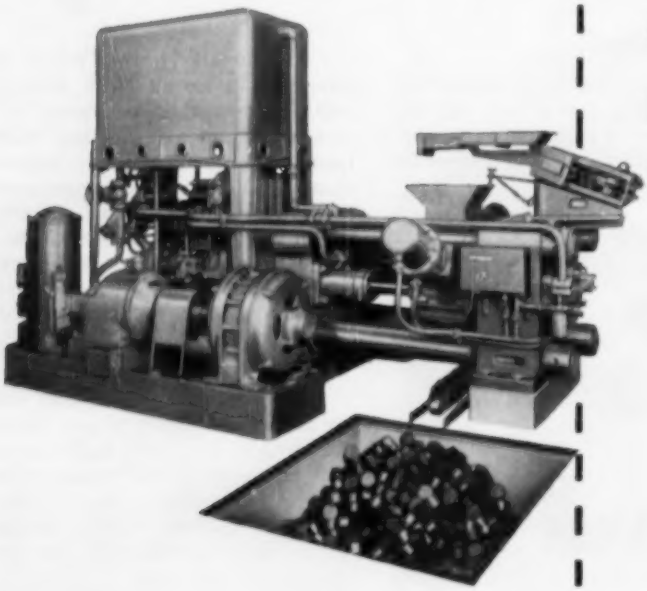
The 90 NB 50 is used in grinding, buffing and other operations where large volumes of dust, chips and shavings accumulate.

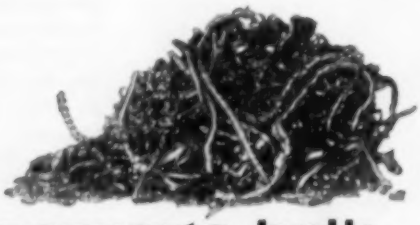


The dust collecting bin (capacity is 37½-cu ft) moves on large rubber-tired ball bearing casters. It can be pushed to the dumping spot, or it can be pulled from under the collector so a fork lift truck can pick it up.

The collector has an air handling capacity of about 10,000 cfm. *Write*: Aget Mfg. Co., Adrian, Mich.

this
"metal-working mint"





converts bulk
machine tool scrap
into briquettes

NEW literature

Write directly to the company for a copy

Plastics Selection

This table compares electrical, mechanical, physical, chemical and machining properties of phenolic laminated plastics and vulcanized fibers. National Vulcanized Fibre Co., 1056 Beech St., Wilmington 99, Del.

Threading Machines

Bulletin H-76-2, 20 pages, describes machines that thread pipes ¼ to 2½-in. in diameter. Landis Machine Co., Waynesboro, Pa.

Metal Bonding

This 11-page bulletin gives engineering data on epoxy resin adhesives for metal-to-metal bonding and honeycomb sandwich construction. Adhesives & Coatings Division, Minnesota Mining & Mfg. Co., 423 Piquette Ave., Detroit 2, Mich.

Nondestructive Testing

Magnetic particle inspection and its advantages are described in this 16-page bulletin. Magnaflux Corp., 7300 W. Lawrence Ave., Chicago 31, Ill.

Gearmotors

Selection data, dimensions, ratings and specifications of fractional horsepower gearmotors are given in bulletin GEA-6133A, 8 pages. General Electric Co., Schenectady 5, N. Y.

Zinc Coating

This 4-page bulletin describes an inorganic zinc coating for structural steel, tank interiors and exteriors, towers and other equipment which is resistant to weathering, abrasion, salt and fresh water, solvents and petroleum products. Amercoat Corp., 4809 Firestone Blvd., South Gate, Calif.

Iron Powder

This 16-page bulletin describes three powders with different growth characteristics because of the presence of copper. Advertising Division, Republic Steel Corp., 3100 E. 45th St., Cleveland 27, O.

Machinery Mounts

Bulletin K2D, 2 pages, describes vibration and noise absorbing mounts that eliminate the need for bolting and shimming. Korfund Co. Inc., 48-40E 32nd Place, Long Island City, N. Y.

Plated Wires

Nickel and brass plated steel wires for appearance or corrosion resistance are described in Bulletin K-10, 8 pages. National-Standard Co., Niles, Mich.

Rib Bolts

Applications of structural rib bolts and locknuts are illustrated in a 4-page bulletin. Automatic Nut Co. Inc., Lebanon, Pa.

Stamping Press

This 4-page bulletin describes a 75-ton double crank press for long, unbalanced progressive die stampings. Alpha Press & Machine Inc., 9281 Freeland Ave., Detroit 28, Mich.

Abrasive Selection

Bulletin 333, 12 pages, covers the selection, application and characteristics of abrasives from sawdust to steel shot. Pangborn Corp., Hagerstown, Md.

Drvie Pulley

This 4-page bulletin describes a drive for belt conveyors which has the gear reduction unit inside the pulley. Department 122, Bunke-Musser Inc., Jackson Center, O.

and extra profits ...automatically!

MILWAUKEE BRIQUETTING PRESSES INCREASE SCRAP VALUE $20.00 PER TON . . . OR MORE . . . by converting bulk borings, turnings and chips into briquettes. Classifying as high-grade scrap, briquettes are small, dense and uniform in size . . . eliminate scrap handling problems . . . require minimum storage space per ton . . . assure a more profitable operation for high-production metal-working plants of all types.

Six models of these automatic hydraulically-operated presses are available. Capacities range from ¾ to 3½ tons per hour.

FOR DETAILS AND PRICES, WRITE FOR BULLETIN 117.

SPO

MILWAUKEE Foundry Equipment Division

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STEEL BILLETS, up to 7" square, are heated in this Selas Gradiation furnace at Lansdowne Steel and Iron Company. Fast heating to 1850°F . . . at rates of 2 to 5 minutes per inch of thickness . . . virtually eliminates scale, thereby reducing billet weight 10%. Fast heated billets are forged at temperatures 300°F below conventional methods.

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In heat treating, brazing, forging, strip-heating and other continuous operations involving both ferrous and nonferrous metals, Selas engineers can design Gradiation heating to help speed production, improve product quality, reduce costs.

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Heat and Fluid Processing Engineers

DEVELOPMENT • DESIGN • CONSTRUCTION

STEEL

December 31, 1956

Market Outlook

THE YEAR 1956 is going out like it came in—with steel production above 90 per cent of capacity.

The entry was heralded with a 94 per cent rate and the exit is marked with a 99 per cent level.

ONE EXCEPTION— The only time this year's steelmaking operations were below 90 per cent of capacity was during the midsummer steelworkers' strike. Generally, the rate was above 95 per cent—part of the time it was above 100 per cent.

Almost full operation of record capacity offset so much of the strike loss that 1956 turns out to be second highest steel production year in history. Production of steel for ingots and castings in the U.S. is totaling around 115 million net tons, compared with the record of 117,036,085 tons produced in 1955.

BUSY FURNACES— Although most steelmaking furnaces are being kept in full operation, the finishing mills are observing the holiday season with abbreviated schedules.

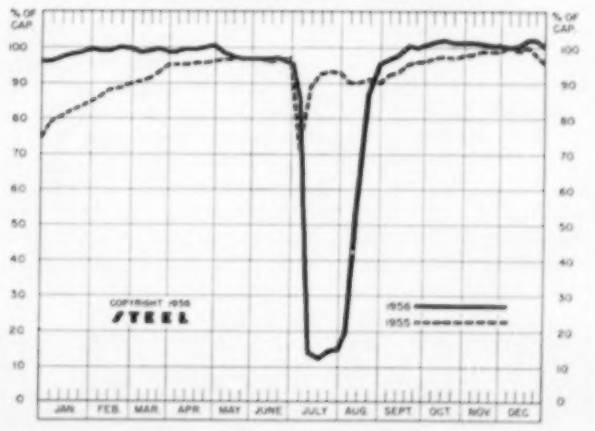
CONTRASTS— While demand for steel is strong enough to keep furnace operations near the 100 per cent mark, there is not the pressure for delivery that there has been at times (except for plates and structurals). You can find many contrasts in demand. There aren't enough plates to go around, but some of the forms of wire, particularly the merchant types, are a drug on the market. Cold-rolled carbon sheets are easy to come by, but hot-rolled carbon sheets are in strong demand. Wants are strong for some of the large sizes of hot-rolled carbon steel bars, but cold-finished bars are in a lull. Large diameter line pipe is booked into 1960.

WANTED: PLATES— Although plates and structurals have been at the top of the list in demand, plates are the greater bottleneck now. One large fabricator is seeing its stock of structural shapes pile up for want of plates to be used with them. This structural stock includes not only the standard shapes but also a liberal supply of the hard-to-get wide flange beams. Practically all these structurals are earmarked for specific projects. Some fabricators are trading structurals for plates and vice versa to keep production going.

PRICES UP 9 PER CENT— The year is ending with steel costing users around 9 per cent more than it did at the start, and prices are continuing to creep upward. Most of the current increases are in price extras, although Colorado Fuel & Iron Corp. raised its base price of carbon steel plates $7 a ton at Claymont, Del. This producer's base price now is $114 a net ton. This increase pushed STEEL's price composite on finished steel for the week ended Dec. 26 to $137.98 a net ton, a 32-cent rise.

A CHANGE— Interestingly, some of the recent increases in base prices and extras on steel have been initiated by producers other than U.S. Steel Corp., the largest producer and (because of its size) ordinarily the pacesetter in pricing. Armco Steel Corp., Middletown, O., made the first move in raising extras on sheets. Allegheny Ludlum Steel Corp., Pittsburgh, was the first to increase base prices of nickel-bearing stainless. U.S. Steel followed in each instance.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Dec. 30	Change	Same Week 1955	Same Week 1954
Pittsburgh	93	— 9	96	74.5
Chicago	103.5	0*	100	83.5
Mid-Atlantic	99	— 3	93.5	70
Youngstown	104	0	100	85
Wheeling	85	—15	96.5	83
Cleveland	90.5	—11	97.5	98
Buffalo	107.5	0	105	100
Birmingham	94.5	+ 0.5	94.5	67
New England	72	— 2	92	70
Cincinnati	90	— 0.5	87.5	74
St. Louis	64	—26.5	105	74.5
Detroit	99	0	100	86.5
Western	103	+ 1	108	69
National Rate	99	— 3	96	79

INGOT PRODUCTION‡

	Week Ended Dec. 30	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	147.5†	157.2	154.9	143.7
NET TONS (In thousands)	2,370†	2,525	2,489	2,309

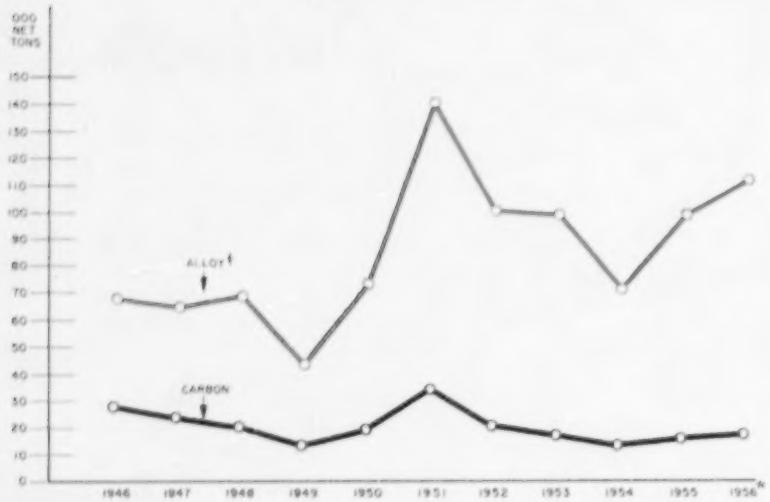
*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,461,893 in 1956; 2,413,278 in 1955; 2,384,549 in 1954.

Metalworking Outlook—p. 21

Technical Outlook—p. 57

TOOL STEEL: Alloys Gain Strength

(Shipments, excluding hollow drill steel)



†Includes the following steels: Class A and Class B high speed, all hot-work, high chromium die, and all other alloy tool steel.
*Estimated by STEEL.
Source: American Iron & Steel Institute.

Tool Steel Sales Head Up

New uses may make 1957 estimates conservative. Industry must add 15,000 tons of capacity to keep up with basic steel expansion, one official says

CONSERVATIVE estimates of the tool steel industry may be upset in 1957. As producers put finishing touches on their best peacetime year, they predict a sales increase of 5 to 10 per cent next year. Although this specialty industry refuses to count a single chicken before it hatches, growth in aircraft, diecasting and extrusion applications of the metal could substantially bolster demand.

American Iron & Steel Institute statistics show that tool steel shipments for the first ten months of 1956 totaled 109,258 tons. Assuming that shipments continue at the same rate in the balance of 1956, the year's total will be 131,000 tons. That's 15,000 tons better than the 1955 mark. Since World War II, only the Korean War year of 1951 saw greater shipments—176,014 tons.

Looking Ahead—A leading tool steel producer predicts: "Shipments in 1957 will be about 5 per cent larger, with die steels and hot-work steels accounting for most of the increase. In the die steels, gains will come in high-carbon, high-chromium types and other abrasion-resisting grades. High speed steels will show an increase of 1 or 2 per cent. Intermediate alloy and carbon tool steels will remain steady."

Sales officials of Allegheny Ludlum Steel Corp., Pittsburgh, report: "We see continued expansion of the market for tool steel, along with the natural expansion of industry. It's necessary to have tool steels to build more products. Also, tool steel analyses for aircraft applications appear to have a good future."

Cautious Look—Another producer reports: "We expect to see a 5000-ton increase in over-all production next year. Auto makers will be leading buyers, but the gain will come in agricultural equipment, road building machinery, extrusion and diecasting. Cold extrusion is growing rapidly and will be a large die steel consumer."

For the immediate future, tool steel predictions reflect the caution of an industry with a product which takes time to turn out. Order backlogs are never high—they currently range from six to eight weeks. Some producers doubt that tonnage sales will ever show much increase, pointing out that new tool steels generally replace outmoded types, and that the product does a much greater job, pound for pound, than it did ten years ago. In addition, carbide producers are making inroads in drilling and tapping of steel and form milling. It's a different story, however, when salesmen talk about some potential growth markets.

New Users—Tool steel's possible uses in aircraft and greater use of new metals (tougher to machine) which wear out tools at a quicker rate could upset predictions of only a gradual sales increase. Among other new and growing uses are dies for extrusion and diecasting of plastics.

Aside from the standard tooling applications, aircraft producers are studying tool steel compositions for structural components, bearings and skin. Hot-work tool steels could be used in areas near hot jet engines.

Uses Soar — A major Pennsylvania tool steel manufacturer sums up: "Aircraft uses of our product have been minor in the last five years, but they should develop sharply in the next five as aircraft develop higher speeds and frictional temperatures. Not only will more planes be produced, but manufacturers will need more tools per unit of production. They will fabricate titanium and new alloys which wear down tools faster."

Tool steel sales respond to the increased use of new alloys in several industries. One sales manager told STEEL that growth in use of high temperature alloys increases the monthly requirements of forgers for dies.

In other principal tool steel markets, mill equipment producers will continue to boost their demand to keep pace with steel expansion. Road building programs will bol-

ster more equipment makers' needs for tool steel.

Auto Sales—James Kurtz, president, Peninsular Steel Co., Detroit, reports automotive demand for tool steel is on the increase. While automotive purchases of the product roughly parallel their production rate, fabrication of some parts is becoming more complicated. In some cases, auto makers who used two dies to form a hood are now using six or eight.

Changes in the sales pattern bring equally sweeping changes in tool steel itself. AISI figures show carbon tool steel shipments declined from 28,049 tons in 1946 to 15,468 tons in 1955. In the same period, hot-work steel shipments rose from 5942 tons to 12,062 tons. High chromium die steels increased from 5444 tons to 10,488 tons. Shipments of all other alloy tool steels gained from 40,043 tons to 52,949 tons.

Less Carbon—A leading manufacturer explains: "The trend is away from the water hardening carbon steels. If a customer's tooling job is minor, he will use cheaper steel. If he needs a good job, he will use the best, cleanest steel. Fabricators want best production for least unit cost. So they switch to air hardening and oil hardening grades, although water hardening grades are still in good demand from auto makers. Demand for top quality spells the end of tool steel melting in open-hearth furnaces."

C. H. McCollam, general manager of sales, Timken Roller Bearing Co., Steel & Tube Division, Canton, O., adds: "We are now installing new atmosphere annealing capacity which will be in operation early in 1957. We consider such equipment essential to the production of high quality tool steels. We introduced a new air hardening graphitic tool steel this year, to combine advantages of this product with increasingly popular air hardening characteristics."

Finished Steel—It's a trend in tool steel production to bring the steel as close to the finished form as possible because of greatly increased labor and equipment costs. Several producers report that ground flat stock is becoming more popular in air and oil hardening steels used in intermediate and long-run dies.

As part of the same trend, Allegheny Ludlum extrudes tool steel in its Watervliet, N. Y., plant. The firm reports progress in use of the extruded product, and it expects applications to grow.

Another firm looking far into future of tool steel sales adds: "As long as basic steel continues to expand, it follows that the tool steel industry must grow to furnish tools for fabricating this added capacity into useful consumer goods. We will have to provide an additional 15,000 tons of capacity in the next three years."

Wire . . .

Wire Prices, Pages 85 & 86

Upholstery wire demand is reported slow, but some mills have order backlogs extending through January. Automotive requirements for January are improved. In fact, a St. Louis area mill reports auto orders are heavier than they were at this time a year ago.

Wire fabric orders are coming out in promising volume. Indications are that shipment releases will be forthcoming earlier than usual. Substantial tonnage of this product is destined for road building.

The merchant wire trade is seasonally slow. But producers anticipate early resumption of buying by jobbers in anticipation of the spring upturn in consuming demand. Manufacturers wire volume is showing some improvement, but it is still disappointing from the standpoint of volume, particularly on automotive account.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 83

The seasonal slump in demand for concrete steel reinforcing bars is less severe this winter than usual. Numerous tonnages required for buildings that have been redesigned for concrete construction, are scheduled for spring delivery. This volume is serving to support high level mill operations.

Order backlogs of both fabricators and distributors are heavy with deliveries becoming more extended in some areas.

Prices on bars in place have firmed in New England, now being about $15 a ton higher than they were at midyear.

The building steel item in most extended delivery is piling, up to 14 months in some instances.

Tool Steel . . .

Tool Steel Prices, Page 87

Tool steel producers expect sales will be up 5 to 10 per cent in 1957. Demand this year bettered that in 1955 by about 10 per cent. Sales to the auto builders are expected to hold level, but larger tonnage is seen moving to road equipment builders, other equipment manufacturers, extruders, diecasters and aircraft manufacturers. Trends toward larger and heavier presses, and increased use of tool steel in extrusion of aluminum and other metals, will bolster sales noticeably.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 84 & 85

Youngstown Sheet & Tube Co. announced increases on hot-rolled and cold-rolled sheets, and high strength grades, effective Dec. 20. The increase on cold rolled and hot rolled amounted to about $2 a ton. Gage and width extras on porcelain enameling sheets were reduced in a range of $1 to $5 a ton, depending on dimensions, but length extras were raised.

Pittsburgh Steel Co., Pittsburgh, also announced changes in its sheet extras in line with revisions effected by other makers. Inland Steel Co., Chicago, announced similar action, effective on shipments Dec. 22. So did Wheeling Steel and Alan Wood Steel.

Sales managers of major sheet producers continue to predict a tightening in cold-rolled sheet supplies in late first quarter. Demand is well within the limits of capacity, and there are open spots in first quarter schedules.

The auto builders, however, are showing more interest in their late first quarter needs, though their indicated volume for the period still is disappointing. The fact that all three major car builders are seeking increased tonnage at the same time is encouraging.

The improvement in auto demand will affect both hot and cold-rolled supplies, but principally hot-rolled, which have been tight right along. There now is little chance hot-rolled backlogs of unfilled orders will be trimmed much next month.

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If the slack in cold-rolled sheet demand is not taken up by auto requirements next quarter, it is likely that the continuous mills will turn out substantially larger tonnages of light plates, especially should government allocations for the oil tanker program increase volume substantially.

Galvanized sheet roofing is being produced close to capacity in the Midwest, a situation that is contrary to the seasonal pattern. Likewise, culvert sheets and welded wire fabric hold near top demand, reflecting demands for highway construction.

Tubular Goods . . .

Tubular Goods Prices, Page 87

Demand for welded pipe for construction applications features the pipe market. Ordering generally slows down at this time.

Improved demand from the auto builders for mechanical tubing is noted. This product has been in relatively light demand throughout the fourth quarter. Indications are that first quarter volume will be up noticeably.

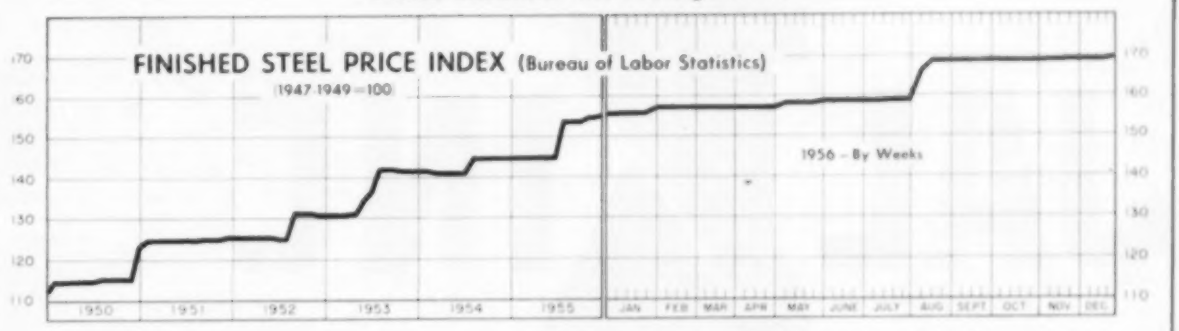
Pipe jobbers in the Philadelphia area have advanced their resale prices 5 per cent across the board to reflect recent upward revisions in mill extras.

Oil country goods consumers are lining up their needs for next summer, but they are finding the market in an increasingly tight supply position. Export demand from South and Central America continues to increase, and there is no likelihood of any excess tonnage in the market in the first half of next year.

In other tubular products, demand ranges from strong for seamless boiler tubes and line pipe, to fair for merchant pipe. Relative slowness in merchant pipe is attributed to seasonal factors, including a decline in housing requirements.

Laclede Steel Co., St. Louis, reports it is about to get started on production of tubing for three lines of consumption that have been growing rapidly the last eight or ten years. These lines are "summer business"—outdoor furniture tubing, backyard gym sets, and lawnmower handles. This type of production—electricweld tubing—is expected to be brisk until June.

Price Indexes and Composites



Dec. 24, 1956	Week Ago	Month Ago	Dec. Avg.	Year Ago
169.3†	169.2	168.8	168.8	155.6

†Preliminary

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Dec. 24

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard, No. 1	$5.150	Bars, Reinforcing	5.738
Rails, Light, 40 lb	6.567	Bars, C.F., Carbon	9.610
Tie Plates	6.025	Bars, C.F., Alloy	13.275
Axles, Railway	9.017	Bars, C.F., Stainless, 302 (lb)	0.526
Wheels, Freight Car, 33 in. (per wheel)	57.50	Sheets, H.R., Carbon	5.765
Plates, Carbon	5.550	Sheets, C.R., Carbon	6.682
Structural Shapes	5.267	Sheets, Galvanized	8.229
Bars, Tool Steel, Carbon (lb)	0.480	Sheets, C.R., Stainless, 302 (lb)	0.643
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.585	Sheets, Electrical	11.225
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.274	Strip, C.R., Carbon	8.843
Bars, Tool Steel H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.769	Strip, C.R., Stainless, 493 (lb)	0.475
Bars, H.R., Alloy	10.025	Strip, H.R., Carbon	5.900
Bars, H.R., Stainless, 303 (lb)	0.495	Pipe, Black, Buttweld (100 ft)	18.376
Bars, H.R., Carbon	5.925	Pipe, Galv., Buttweld (100 ft)	22.516
		Pipe, Line (100 ft)	182.860
		Casing, Oil Well, Carbon (100 ft)	178.046
		Casing, Oil Well, Alloy (100 ft)	276.870
Tubes, Boiler (100 ft)	45.633	Black Plate, Canmaking Quality	7.233
Tubing, Mechanical, Carbon (100 ft)	22.973	Wire, Drawn, Carbon	9.175
Tubing, Mechanical, Stainless, 304 (100 ft)	187.133	Wire, Drawn, Stainless, 430 (lb)	0.630
Tin Plate, Hot-dipped, 1.25 lb	9.433	Bale Ties (bundle)	7.213
Tin Plate, Electrolytic, 0.25 lb	8.133	Nails, Wire, 8d Common	9.365
		Wire, Barbed (80-rod spool)	8.412
		Woven Wire Fence (20-rod roll)	20.505

STEEL's FINISHED STEEL PRICE INDEX*

	Dec. 26 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	225.92	225.92	225.92	208.90	171.92
Index in cents per lb	6.111	6.111	6.111	5.659	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel NT*	$137.98	$137.66	$137.66	$127.68	$106.32
No. 2 Fdry Pig Iron, GT	62.63	62.63	62.63	58.99	52.54
Basic Pig Iron, GT	62.18	62.18	62.18	58.49	52.16
Malleable Pig Iron, GT	63.41	63.41	63.41	59.77	53.27
Steelmaking Scrap, GT	64.50	64.83	64.67	51.83	43.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Dec. 26 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	5.075	5.075	5.075	4.65	3.70
Bars, H.R., Chicago	5.075	5.075	5.075	4.65	3.70
Bars, H.R., deld., Philadelphia	5.35	5.35	5.35	4.99	4.223
Bars, C.F., Pittsburgh	6.85*	6.85*	6.85*	5.90	4.55
Shapes, Std., Pittsburgh	5.00	5.00	5.00	4.60	3.65
Shapes, Std., Chicago	5.00	5.00	5.00	4.60	3.65
Shapes, deld., Philadelphia	5.40	5.40	5.40	4.88	3.918
Plates, Pittsburgh	4.85	4.85	4.85	4.50	3.70
Plates, Chicago	4.85	4.85	4.85	4.50	3.70
Plates, Coatesville, Pa.	5.25	5.25	5.25	4.80	4.15
Plates, Sparrows Point, Md.	4.85	4.85	4.85	4.50	3.70
Plates, Claymont, Del.	5.70	5.35	5.35	4.80	4.15
Sheets, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.60-3.75
Sheets, H.R., Chicago	4.675	4.675	4.675	4.325	3.60
Sheets, C.R., Pittsburgh	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Chicago	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Detroit	5.75-5.85	5.75-5.85	5.75-5.85	5.325-5.425	4.55
Sheets, Galv., Pittsburgh	6.30	6.30	6.30	5.85	4.80
Strip, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.75-4.00
Strip, H.R., Chicago	4.675	4.675	4.675	4.325	2.50
Strip, C.R., Pittsburgh	6.85	6.85	6.85	6.25	4.65-5.35
Strip, C.R., Chicago	6.85	6.85	6.85	6.25-6.35	4.90
Strip, C.R., Detroit	6.95	6.95	6.95	6.35	4.85-5.60
Wire, Basic, Pittsburgh	7.20	7.20	7.20	6.25	4.85-5.10
Nails, Wire, Pittsburgh	8.20	8.20	8.20	7.60	5.90-6.20
Tin plate (1.50 lb), box, Pitts.	$9.95	$9.95	$9.95	$9.45	$8.70

*Including 0.35c for special quality

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$91.50	$91.50	$91.50	$84.50	$66.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	5.80	5.80	5.80	5.025	4.10-4.30

PIG IRON, Gross Ton	Dec. 26 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bessemer, Pitts.	$63.50	$63.50	$63.50	$59.50	$53.00
Basic, Valley	62.50	62.50	62.50	58.50	52.00
Basic, deld. Phila.	66.26	66.26	66.26	62.16	56.61
No. 2 Fdry, Neville Island, Pa.	63.00	63.00	63.00	59.00	52.50
No. 2 Fdry, Chicago	63.00	63.00	63.00	59.00	52.50
No. 2 Fdry, deld. Phila.	66.76	66.76	66.76	62.66	57.11
No. 2 Fdry, Birm.	59.00	59.00	59.00	56.00	48.88
No. 2 Fdry (Birm.) deld. Cin.	66.70	66.70	66.70	62.70	55.49
Malleable, Valley	63.00	63.00	63.00	59.00	52.50
Malleable, Chicago	63.00	63.00	63.00	59.00	52.50
Ferromanganese, Duquesne	235.00†	235.00†	235.00†	190.00†	188.00**

†74-76% Mn, net ton. **75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$66.50	$66.50	$66.50	$51.00	$44.00
No. 1 Heavy Melt, E. Pa.	63.00	63.00	62.50	55.00	42.50
No. 1 Heavy Melt, Chicago	64.00	65.00	65.00	49.50	42.50
No. 1 Heavy Melt, Valley	66.50	66.50	66.50	52.50	44.00
No. 1 Heavy Melt, Cleve.	65.00	65.00	65.00	51.50	43.00
No. 1 Heavy Melt, Buffalo	62.50	62.50	59.50	45.50	43.00
Rails, Rerolling, Chicago	89.50	89.50	89.00	71.00	52.50
No. 1 Cast, Chicago	50.50	50.50	50.50	50.50	49.00

COKE, Net Ton					
Beehive, Furn, Connlsvl.	$14.50	$14.50	$14.50	$14.125	$14.75
Beehive, Fdry, Connlsvl.	17.50	17.50	17.50	16.50	17.50

JONES & LAUGHLIN INTRODUCES

JALZINC*

*Registration applied for.

JALZINC is Jones & Laughlin's new trade name for its *high quality* zinc coated steel sheet and coiled product. JALZINC answers your toughest forming, rolling and drawing problems.

Produced by the proven Sendzimir process, JALZINC has a tight, uniform coating that resists cracking and flaking. The high lustre finish greatly improves the appearance of your end product. JALZINC is available in a wide range of gages and widths in both cut lengths and coils.

Users are enthusiastic about JALZINC'S uniform ductility, flatness and surface finish. Write today for complete details.

J&L inspector examines a roll of 18 gage JALZINC as it is coiled on a reel of the new Sendzimir continuous line.

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J&L STEEL

Jones & Laughlin
STEEL CORPORATION · PITTSBURGH

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.*
Code numbers following mill points indicate producing company. Key to producers, page 84; to footnotes, page 86.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 .....$70.50

INGOTS, Alloy (NT)

Detroit R7 .....$74.00
Houston 85 .....74.00
Midland,Pa. C18 .....74.00
Munhall,Pa. U5 .....74.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)

Aliquippa,Pa. J5 ....$74.00
Bessemer,Pa. U5 .....74.00
Bridgeport,Conn. N19..79.00
Buffalo R2 .....74.00
Clairton,Pa. U5 .....74.00
Ensley,Ala. T2 .....74.00
Fairfield,Ala. T2 .....74.00
Fontana,Calif. K1 ....83.50
Gary,Ind. U5 .....74.00
Johnstown,Pa. B2 ....74.00
Lackawanna,N.Y. B2 ..74.00
LoneStar,Tex. L6 ....80.00
Munhall,Pa. U5 .....74.00
Pittsburgh J5 .....74.00
S Chicago,Ill. R2, U5..74.00
S Duquesne,Pa. U5 ..74.00
Sterling,Ill. N15 .....74.00
Youngstown R2 .....74.00

Carbon, Forging (NT)

Aliquippa,Pa. J5 ....$91.50
Bessemer,Pa. U5 .....91.50
Bridgeport,Conn. N19..96.50
Buffalo R2 .....91.50
Canton,O. R2 .....94.00
Clairton,Pa. U5 .....91.50
Conshohocken,Pa. A3 ..96.50
Ensley,Ala. T2 .....91.50
Fairfield,Ala. T2 .....91.50
Fontana,Calif. K1 ....101.00
Gary,Ind. U5 .....91.50
Geneva,Utah C11 ....91.50
Houston 85 .....96.50
Johnstown, Pa. B2 ....91.50
Lackawanna,N.Y. B2..91.50
LosAngeles B3 .....101.00
Midland,Pa. C18 .....91.50
Munhall,Pa. U5 .....91.50
Pittsburgh J5 .....91.50
Seattle B3 .....105.00
S Chicago R2, U5, W14 91.50
S Duquesne,Pa. U5 ....91.50
S.SanFrancisco B3 ..101.00

Alloy, Forging (NT)

Bethlehem,Pa. B2 ..$107.00
Bridgeport,Conn. N19 107.00
Buffalo R2 .....107.00
Canton,O. R2 .....107.00
Conshohocken,Pa. A3 .114.00
Detroit R7 .....107.00
Fontana,Calif. K1 ....128.00
Gary,Ind. U5 .....107.00
Houston 85 .....112.00
Ind.Harbor,Ind. Y1 ..107.00
Johnstown Pa. B2 ....107.00
Lackawanna,N.Y. B2 .107.00
LosAngeles B3 .....127.00
Massillon,O. R2 .....107.00
Midland,Pa. C18 .....107.00
Munhall,Pa. U5 .....107.00
S.Chicago R2,U5,W14 107.00
S.Duquesne,Pa. U5 ..107.00
Struthers,O. Y1 .....107.00
Warren,O. C17 .....107.00

ROUNDS, SEAMLESS TUBE (NT)

Bridgeport,Conn. N19 $116.50
Buffalo R2 .....111.50
Canton,O. R2 .....114.00
Cleveland,O. R2 .....111.50
Gary,Ind. U5 .....111.50
S.Chicago,Ill. R2,W14 111.50
S.Duquesne,Pa. U5 ..111.50

SKELP

Aliquippa,Pa. J5 ....4.725
LoneStar,Tex. L6 ....5.025
Munhall,Pa. U5 .....4.625
SparrowsPoint,Md. B2..4.625
Warren,O. R2 .....4.625
Youngstown R2, U5 ..4.625

WIRE RODS

AlabamaCity,Ala. R2 ..5.80
Aliquippa,Pa. J5 .....5.00
Alton,Ill. L1 .....6.00
Buffalo W12 .....5.80
Cleveland A7 .....5.80
Donora,Pa. A7 .....5.80
Fairfield,Ala. T2 .....5.80
Houston 85 .....6.05
IndianaHarbor,Ind. Y1 5.80
Johnstown,Pa. B2 .....5.80
Joliet,Ill. A7 .....5.80
KansasCity,Mo. 85 ....6.05
Kokomo,Ind. C16 .....5.90
LosAngeles B3 .....6.60
Minnequa,Colo. C10 ..6.05
Moreesen,Pa. P7 .....5.80
N.Tonawanda,N.Y. B11 5.80
Pittsburg,Calif. C11 ....6.45
Portsmouth,O. P12 ....5.80
Roebling,N.J. R5 .....5.90
S.Chicago,Ill. R2 .....5.80
SparrowsPoint,Md. B2 ..5.90
Sterling,Ill.(1) N15 ....5.80
Sterling,Ill. N15 .....5.90
Struthers,O. Y1 .....5.80
Worcester,Mass. A7 ....6.10

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2 .....5.00
Aliquippa,Pa. J5 .....5.00
Bessemer,Ala. T2 .....5.00
Bethlehem,Pa. B2 .....5.05
Birmingham C15 .....5.30
Clairton,Pa. U5 .....5.00
Fairfield,Ala. T2 .....5.00
Fontana,Calif. K1 .....5.70
Gary,Ind. U5 .....5.00
Geneva,Utah C11 .....5.00
Houston 85 .....5.10
Ind.Harbor,Ind. I-2 ....5.00
Johnstown,Pa. B2 .....5.05
KansasCity,Mo. 85 ....5.10
Lackawanna,N.Y. B2 ..5.05
LosAngeles B3 .....5.70
Minnequa,Colo. C10 ....5.30
Munhall,Pa. U5 .....5.00
Niles,Calif. P1 .....5.75
Phoenixville,Pa. P4 ....5.85
Portland,Oreg. O4 .....5.80
Seattle B3 .....5.75
S.Chicago,Ill. U5, W14 ..5.00
S. SanFrancisco B3 ....5.65
Sterling,Ill. N15 .....5.00
Torrance,Calif. C11 ....5.70
Weirton,W.Va. W6 .....5.00

Wide Flange

Bethlehem,Pa. B2 .....5.05
Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 .....5.85
IndianaHarbor,Ind. I-2..5.00
Lackawanna,N.Y. B2 ..5.05
Munhall,Pa. U5 .....5.00
Phoenixville,Pa. P4 ....5.85
S.Chicago,Ill. U5 .....5.00

Alloy Std. Shapes

Clairton,Pa. U5 .....6.20
Gary,Ind. U5 .....6.20
Houston 85 .....6.30
Munhall,Pa. U5 .....6.20
S.Chicago,Ill U5 .....6.20

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5 .....7.35
Bessemer,Ala. T2 .....7.35
Bethlehem,Pa. B2 .....7.40
Clairton,Pa. U5 .....7.35
Fairfield,Ala. T2 .....7.35
Fontana,Calif. K1 .....8.05
Gary,Ind. U5 .....7.35
Geneva,Utah C11 .....7.35
Houston 85 .....7.45
Ind.Harbor,Ind. I-2,Y1 7.35
Johnstown,Pa. B2 .....7.40
KansasCity,Mo. 85 ....7.45
Lackawanna,N.Y. B2 ..7.40
LosAngeles B3 .....8.05
Munhall,Pa. U5 .....7.35
Seattle B3 .....8.10
S.Chicago,Ill. U5, W14..7.35
S.SanFrancisco B3 ....8.00
Struthers,O. Y1 .....7.35

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 .....7.40
Ind.Harbor,Ind. I-2 ....7.35
Lackawanna,N.Y. B2 ..7.40
Munhall,Pa. U5 .....7.35
S.Chicago,Ill. U5 .....7.35

PILING

BEARING PILES

Bethlehem,Pa. B2 .....5.05
Lackawanna,N.Y. B2 ..5.05
Munhall,Pa. U5 .....5.00
S.Chicago,Ill. U5 .....5.00

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ...5.90
Lackawanna,N.Y. B2 ..5.90
Munhall,Pa. U5 .....5.90
S.Chicago,Ill. U5 .....5.90

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 .....4.85
Aliquippa,Pa. J5 .....4.85
Ashland,Ky. (15) A10..4.85
Bessemer,Ala. T2 .....4.85
Bridgeport,Conn. N19 ..4.75
Clairton,Pa. U5 .....4.85
Clayment,Del. C22 ....5.70
Cleveland J5, R2 .....4.85
Coatesville,Pa. L7 ....5.25
Conshohocken,Pa. A3 ..4.90
Detroit M1 .....4.95
Ecorse,Mich. G5 .....4.95
Fairfield,Ala. T2 .....4.85
Fontana,Calif.(30) K1 ..5.55
Gary,Ind. U5 .....4.85
Geneva,Utah C11 .....4.85
GraniteCity,Ill. G4 ....5.05
Harrisburg,Pa. P4 .....5.80
Houston 85 .....4.95
Ind.Harbor,Ind. I-2, Y1 4.85
Johnstown,Pa. B2 .....4.85
Lackawanna,N.Y. B2 ..4.85
LoneStar,Tex. L6 .....5.20
Minnequa,Colo. C10 ....5.70
Munhall,Pa. U5 .....4.85
Newport,Ky. N9 .....4.85
Pittsburgh J5 .....4.85
Riverdale,Ill. A1 .....4.85
Seattle B3 .....5.75
Sharon,Pa. S3 .....4.85
S.Chicago,Ill. U5, W14 ..4.85
SparrowsPoint,Md. B2 ..4.85
Steubenville,O. W10 ....4.85
Warren,O. R2 .....4.85
Weirton,W.Va. W6 .....4.85
Youngstown R2, U5, Y1 4.85

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 ....6.20
Fontana,Calif. K1 .....6.70
Geneva, Utah C11 ....6.00
Jonhstown,Pa. B2 .....5.65
SparrowsPoint,Md. B2 ..5.65

PLATES, Wrought Iron

Economy,Pa. B14 ....11.128

PLATES, High-Strength Low-Alloy

Aliquippa,Pa. J5 .....7.25
Bessemer,Ala. T2 .....7.25
Clairton,Pa. U5 .....7.25
Claymont,Del. C22 .....7.55
Cleveland J5, R2 .....7.25
Coatesville,Pa. L7 .....7.55
Conshohocken,Pa. A3 ..7.25
Ecorse,Mich. G5 .....7.35
Fairfield,Ala. T2 .....7.25
Fontana,Calif.(30) K1 ..7.95
Gary,Ind. U5 .....7.25
Geneva,Utah C11 .....7.25
Houston 85 .....7.35
Ind.Harbor,Ind. I-2, Y1 7.25
Johnstown,Pa. B2 .....7.25
Munhall,Pa. U5 .....7.25
Pittsburgh J5 .....7.25
Seattle B3 .....8.15
Sharon,Pa. S3 .....7.25
S.Chicago,Ill. U5, W14 ..7.25
SparrowsPoint,Md. B2 ..7.25
Warren,O. R2 .....7.25
Youngstown U5, Y1 ....7.25

PLATES Alloy

Bridgeport,Conn. N19 ..6.55
Claymont,Del. C22 .....6.85
Coatesville,Pa. L7 .....6.85
Fontana,Calif.(30) K1 ..7.56
Gary,Ind. U5 .....6.85
Houston 85 .....6.95
Ind.Harbor,Ind. Y1 ....6.85
Johnstown,Pa. B2 .....6.85
Munnall,Pa. U5 .....6.85
Newport,Ky. N9 .....6.85
Seattle B3 .....7.75
Sharon,Pa. S3 .....6.85
S.Chicago,Ill. U5, W14 ..6.85
SparrowsPoint,Md. B2 ..6.85
Youngstown Y1 .....6.85

FLOOR PLATES

Cleveland J5 .....5.925
Conshohocken,Pa. A3 ..5.925
Harrisburg,Pa. P4 .....6.275
Ind.Harbor,Ind. I-2 ...5.925
Munhall,Pa. U5 .....5.925
S.Chicago,Ill. U5 .....5.925

PLATES, Ingot Iron

Ashland c.l. (15) A10 ..5.10
Ashland l.c.l. (15) A10 ..5.60
Cleveland c.l. R2 .....5.60
Warren,O. c.l. R2 .....5.60

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2 ..5.075
Aliquippa,Pa.(9) J5 ..5.075
Alton,Ill. L1 .....5.275
Atlanta(9) A11 .....5.575
Besse.ner,Ala. (9) T2 ..5.075
Bir ningham(9) C15 ...5.375
Bridgeport,Conn. N19 ..5.30
Buffalo(9) R2 .....5.075
Clairton,Pa. U5 .....5.075
Cleveland(9) R2 .....5.075
Ecorse,Mich.(9) G5 ....5.175
Emeryville,Calif. J7 ....5.85
Fairfield,Ala.(9) T2 ..5.075
Fairless,Pa.(9) U5 ....5.225
Fontana,Calif.(9) K1 ..5.775
Gary,Ind.(9) U5 .....5.075
Geneva,Utah(9) C11 ..5.157
Houston(9) 85 .....5.325
Ind.Harbor(9) I-2, Y1 5.075
Johnstown,Pa.(9) B2 ..5.075
Joliet,Ill. P22 .....5.575
KansasCity,Mo.(9) 85 .5.325
Lackawanna(9) B2 ....5.075
LosAngeles(9) B3 .....5.775
Milton,Pa.(23) M18 ...5.425
Minnequa,Colo. C10 ...5.525
Niles,Calif. P1 .....5.85
N Tonawanda,N.Y.(9)B11 5.075
Pittsburg,Calif.(9) C11 5.775
Pittsbugh(9) J5 .....5.075
Portland,Oreg. O4 .....5.85
Seattle B3, N14 .....5.825
S.Ch'c'go(9)R2,U5,W14 5.075
S.Duquesne,Pa.(9) U5 ..5.075
S.SanFran..Calif.(9) B3 5.825
Sterling,Ill.(1) N15 ....5.075
Sterling,Ill. N15 .....5.175
Struthers,O. Y1 .....5.075
Torrance,Calif.(9) C11..5.775
Weirton,W.Va.(9)W6 ...5.075
Youngstown(9) R2, U5 5.075

BARS, H.R. Loaded Alloy (Including leaded extra)

Warren,O. C17 .....7.125

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 .....6.125
Bridgeport,Conn. N19 ..6.20
Buffalo R2 .....6.125
Canton,O. R2 .....6.125
Clairton,Pa. U5 .....6.125
Detroit R7 .....6.125
Ecorse,Mich. G5 .....6.225
Fairless,Pa. U5 .....6.275
Fontana,Calif. K1 ....7.178
Gary,Ind. U5 .....6.125
Houston 85 .....6.375
Ind.Harbor,Ind. I-2,Y1 6.125
Johnstown,Pa. B2 .....6.125
KansasCity,Mo. 85 ....6.375
Lackawanna,N.Y. B2 ..6.125
LosAngeles B3 .....7.175
Massillon,O. R2 .....6.125
Midland,Pa. C18 .....6.125
S.Chicago R2,U5, W14 6.125
S.Duquesne,Pa. U5 ....6.125
Struthers,O. Y1 .....6.125
Warren,O. C17 .....6.125
Youngstown U5 .....6.125

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 .....7.425
Bessemer,Ala. T2 .....7.425
Bethlehem,Pa. B2 .....7.425
Bridgeport,Conn. N19 ..7.50
Clairton,Pa. U5 .....7.425
Cleveland R2 .....7.425
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.425
Fontana,Calif. K1 ....8.125
Gary,Ind. U5 .....7.425
Houston 85 .....7.675
Ind.Harbor,Ind. Y1 ....7.425
Johnstown,Pa. B2 .....7.425
KansasCity,Mo. 85 ....7.675
Lackawanna,N.Y. B2 ..7.425
LosAngeles B3 .....8.125
Pittsburgh J5 .....7.425
Seattle B3 .....8.175
S.Chicago,Ill. U5, W14 7.425
S.Duquesne,Pa. U5 ....7.425
S.SanFrancisco B3 ....8.175
Struthers,O. Y1 .....7.425
Youngstown U5 .....7.425

BAR SIZE ANGLES, H.R. Carbon

Bethlehem,Pa.(9) B2 ..5.225
Houston 85 .....5.325
KansasCity,Mo. 85 ....5.325
Lackawanna(9) B2 .....5.075
Sterling,Ill. N15 .....5.175
Sterling,Ill.(1) N15 ...5.075

BAR SIZE ANGLES, S. Shapes

Aliquippa,Pa. J5 .....5.075
Atlanta A11 .....5.575
Joliet,Ill P22 .....5.10
Niles,Calif. P1 .....5.85
Pittsburgh J5 .....5.075
Portland,Oreg. O4 .....5.85
San Francisco B7 .....5.95

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5 .....6.20
Gary,Ind. U5 .....6.20
Houston 85 .....6.45
KansasCity,Mo. 85 ....6.45
Youngstown U5 .....6.20

BARS, C.F. Leaded Alloy (Including leaded extra)

Ambridge,Pa. W18 ....9.475
BeaverFalls,Pa. M12 ..9.475
Chicago W18 .....9.475
Cleveland C20 .....9.475
LosAngeles S30 .....11.10
LosAngeles P2 .....11.00
Monaca,Pa. S17 .....9.225
Newark,N.J. W18 .....9.65
Warren,O. C17 .....9.475

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 .....6.85
BeaverFalls,Pa. M12,R2 6.85
Bridgeport,Conn. N19 ..7.20
Buffalo R5 .....6.90
Camden,N.J. P13 .....7.30
Carnegie,Pa. C12 .....6.85
Chicago W18 .....6.85
Cleveland A7, C20 .....6.85
Detroit B5, P17 .....7.05
Detroit R7 .....6.85
Donora,Pa. A7 .....6.85
Elyria,O. W8 .....6.85
FranklinPark,Ill. N5 ..6.85
Gary,Ind. U5 .....6.85
GreenBay,Wis. F7 .....6.85
Hammond,Ind. L2, M13 .6.85
Hartford,Conn. R2 .....7.35
Harvey,Ill. B5 .....6.85
LosAngeles(49) S30 ....8.30
LosAngeles P2, R2 .....8.30
Mansfield,Mass. B5 .....7.40
Massillon,O. R2, R8 ....6.85
Midland,Pa. C18 .....6.85
Monaca,Pa. S17 .....6.85
Newark,N.J. W18 .....7.30
NewCastle,Pa.(17) B4 ..6.85
Pittsburgh J5 .....6.85
Plymouth,Mich. P5 .....7.10
Putnam,Conn. W18 .....7.40
Readville,Mass. C14 ....7.40
S.Chicago,Ill. W14 .....6.85
SpringCity,Pa. K3 .....7.30
Struthers,O. Y1 .....6.85
Waukegan,Ill. A7 .....6.85
Youngstown F3, Y1 ....6.85

BARS Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19..6.10

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....8.325
BeaverFalls,Pa.M12,R2 8.325
Bethlehem,Pa. B2 .....8.325
Bridgeport,Conn. N19 ..8.475
Buffalo B5 .....8.350
Camden,N.J. P13 .....8.50
Canton,O. T7 .....7.425
Carnegie,Pa. C12 .....8.325
Chicago W18 .....8.325
Cleveland A7, C20 .....8.325
Detroit B5, P17 .....8.575
Detroit R7 .....8.325
Donora,Pa. A7 .....8.325
Elyria,O. W8 .....8.325
FranklinPark,Ill. N5 ..8.325
Gary,Ind. R2 .....8.325
GreenBay,Wis. F7 .....8.325
Hammond,Ind. L2, M13 8.325
Hartford,Conn. R2 .....8.625
Harvey,Ill. B5 .....8.325
Lackawanna,N.Y. B2 ..8.325
LosAngeles P2, S30 ..10.10
Mansfield,Mass. B5 ...8.625
Massillon,O. R2, R8 ...8.325
Midland,Pa. C18 .....8.325
Monaca,Pa. S17 .....8.375
Newark,N.J. W18 .....8.50
Plymouth,Mich. P5 .....8.325
S.Chicago W14 .....8.325
SpringCity,Pa. K3 .....8.50
Struthers,O. Y1 .....8.325
Warren,O. C17 .....8.325
Waukegan,Ill. A7 .....8.325
Worcester,Mass. A7 ....8.625
Youngstown F3, Y1 ....8.325

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 .....5.075
Atlanta A11 .....5.575
Birmingham C15 .....5.375
Bridgeport,Conn. N19 ..5.30
Buffalo R2 .....5.075
Cleveland R2 .....5.075
Ecorse,Mich. G5 .....5.425
Emeryville,Calif. J7 ....5.85
Fairfield,Ala. T2 .....5.075
Fairless,Pa. U5 .....5.225

Ft. Worth, Tex. (42) T4 .5.525
Gary, Ind. U5 .....5.675
Houston B5 .....5.325
Ind. Harbor, Ind. I-2, Y1 5.075
Johnstown, Pa. B2 ....5.075
Joliet, Ill. F22 .....5.575
KansasCity, Mo. B5 ....5.325
Lackawanna, N.Y. B2 .5.075
LosAngeles B2 .....5.775
Milton, Pa. M18 .....5.225
Minnequa, Colo. C19 ..5.525
Niles, Calif. P1 .....5.85
Pittsburg, Calif. C11 ..5.775
Pittsburgh J5 .....5.075
Portland, Oreg. O4 .....5.85
SandSprings, Okla. S5 ..5.575
Seattle B3, N14 .....5.825
S. Chicago, Ill. R2 .....5.075
S. Duquesne, Pa. U5 ....5.075
S. SanFrancisco B3 ....5.525
SparrowsPoint, Md. B2 .5.075
Sterling, Ill. (1) N15 ...5.075
Sterling, Ill. R15 .....5.175
Struthers, O. Y1 .....5.075
Torrance, Calif. C11 ...5.775
Youngstown R2, U8 ..5.075

BARS, Reinforcing
(Fabricated; to Consumers)

Chicago U8 .....6.81
Cleveland U8 .....6.79
Johnstown, Pa. ½-1" B2 6.73
KansasCity, Mo. S5 ....7.00
Marion, O. P11 .....6.70
New York U8 .....7.18
Pittsburgh U8 .....6.75
Seattle B3, N14 .....7.20
SparrowsPt. ½-1" B2 ..6.73
Williamsport, Pa. S19 ..6.65

RAIL STEEL BARS

ChicagoHts. (3) C2, I-2 .5.675
ChicagoHts. (4) I-2 ....5.975
ChicagoHts. (4) C2 ....5.65
Ft. Worth, Tex. (26) T4 ..5.525
Franklin, Pa. (4) F5 ....5.60
Franklin, Pa. (3) F5 ....5.10
JerseyShore, Pa. (4) J8 ..5.00
Marion, O. (3) P11 .....5.15
Moline, Ill. (2) H2 .....5.225
Tonawanda (3) B12 ....5.65
Tonawanda (4) B12 ....6.15
Williamsport, Pa. (3) S19 5.65

BARS, Wrought Iron

Economy, Pa. (S.R.) B14 12.306
Economy, Pa. (D.R.) B14 15.301
Economy (Staybolt) B14 15.676
McK. Rks. (S.R.) L5 ...13.15
McK. Rks. (D.R.) L5 ...16.00
McK. Rks. (Staybolt) L5 .19.50

SHEETS

SHEETS, Hot-Rolled Steel
(18 Gage and Heavier)

Ala. City, Ala. R2 .....4.675
Allenport, Pa. P7 .....4.675
Ashland, Ky. (8) A10 ..4.675
Cleveland J5, R2 .....4.675
Conshohocken, Pa. A3 ..4.725
Detroit (8) M1 .....4.775
Dravosburg, Pa. U5 ....4.675
Ecorse, Mich. G5 .....4.775
Fairfield, Ala. T2 .....4.675
Fairless, Pa. U5 .....4.725
Fontana, Calif. K1 ....5.475
Gary, Ind. U5 .....4.675
Geneva, Utah C11 .....4.775
GraniteCity, Ill. (8) G4 ..4.875
Ind. Harbor, Ind. I-2, Y1 4.675
Lackawanna, N.Y. B2 ..4.675
Munhall, Pa. U5 .....4.675
Newport, Ky. (8) N9 ...4.675
Niles, O. M21 .....4.675
Pittsburg, Calif. C11 ..5.375
Pittsburgh J5 .....4.675
Portsmouth, O. P12 ....4.675
Riverdale, Ill. A1 .....4.675
Sharon, Pa. S3 .....4.675
S. Chicago, Ill. W14 ....4.675
SparrowsPoint, Md. B2 ..4.675
Steubenville, O. W10 ..4.675
Warren, O. R2 .....4.675
Weirton, W. Va. W6 ....4.675
Youngstown U8, Y1 ..4.675

SHEETS, H.R., (19 Ga. & Lighter)

Niles, O. M21 .....5.75

SHEETS, H.R. Alloy

Dravosburg, Pa. U5 ....7.75
Gary, Ind. U5 .....7.75
Ind. Harbor, Ind. Y1 ....7.75
Newport, Ky. N9 .....7.75
Youngstown Y1, U5 ....7.75

SHEETS, H.R. (14 Ga. & Heavier)
High-Strength Low-Alloy

Cleveland J5, R2 .....6.90
Conshohocken, Pa. A3 ..6.95
Dravosburg, Pa. U5 ....6.90
Ecorse, Mich. G5 .....7.00
Fairfield, Ala. T2 .....6.90
Fairless, Pa. U5 .....6.95
Fontana, Calif. K1 .....7.70
Gary, Ind. U5 .....6.90
Ind. Harbor, Ind. I-2, Y1 6.90
Lackawanna (35) B2 ....6.90
Munhall, Pa. U5 .....6.90
Pittsburgh J5 .....6.90
S. Chicago, Ill. U5 .....6.90
SparrowsPoint (36) B2 ..6.90
Warren, O. R2 .....6.90
Weirton, W. Va. W6 ....6.90
Youngstown U8, Y1 ....6.90

SHEETS, Hot-Rolled Ingot Iron
(18 Gage and Heavier)

Ashland, Ky. (8) A10 ...4.925
Cleveland R2 .....5.425
Ind. Harbor, Ind. I-2 ..4.925
Warren, O. R2 .....5.425

SHEETS, Cold-Rolled Steel
(Commercial Quality)

Allenport, Pa. P7 .....5.75
Cleveland J5, R2 .....5.75
Conshohocken, Pa. A3 ...5.80
Detroit M1 .....5.75
Dravosburg, Pa. U5 ....5.75
Ecorse, Mich. G5 .....5.85
Fairfield, Ala. T2 .....5.75
Fairless, Pa. U5 .....5.80
Follansbee, W. Va. F4 ..5.75
Fontana, Calif. K1 ....5.95
Gary, Ind. U5 .....5.75
GraniteCity, Ill. G4 ....5.95
Ind. Harbor, Ind. I-2, Y1 5.75
Lackawanna, N.Y. B2 ..5.75
Mansfield, O. E6 .....5.75
Middletown, O. A10 ....5.75
Newport, Ky. N9 .....5.75
Pittsburg, Calif. C11 ...6.70
Pittsburgh J5 .....5.75
Portsmouth, O. P12 ....5.75
SparrowsPoint, Md. B2 ..5.75
Steubenville, O. W10 ....5.75
Warren, O. R2 .....5.75
Weirton, W. Va. W6 ....5.75
Yorkville, O. W10 .....5.75
Youngstown Y1 .....5.75

SHEETS, Cold-Rolled
High-Strength, Low-Alloy

Cleveland J5, R2 .....6.525
Dravosburg, Pa. U5 ....6.525
Ecorse, Mich. G5 .....6.625
Fairless, Pa. U5 .....6.575
Fontana, Calif. K1 ....9.725
Gary, Ind. U5 .....6.525
Indiana Harbor, Ind. Y1 .6.525
Lackawanna (37) B2 ..6.525
Pittsburgh J5 .....6.525

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.50
Middletown, O. A10 ....6.25
Warren, O. R2 .....6.50

SHEETS, Culvert	Cu Steel	Cu Fe
Ashland, Ky. A10	6.65	6.90
Canton, O. R2	6.65	7.15
Dravosburg U8	6.65	6.90
Fairfield T2	6.65	6.90
Gary, Ind. U5	6.65	6.90
GraniteCity, Ill. G4	6.85	...
Ind. Harbor I-2	6.65	6.90
Kokomo, Ind. C16	6.75	...
MartinsFry. W10	6.65	...
Pittsburgh J5	...	6.65
Pitts., Calif. C11	7.40	...
SparrowsPt. B2	6.65	...

SHEETS, Culvert—Pure Iron

Dravosburg, Pa. U5 ....6.90
Gary, Ind. U5 .....6.90
Ind. Harbor, Ind. I-2 ....6.90
MartinsFry., O. W10 ....6.90

SHEETS, Galvanized Steel
Hot-Dipped

Ala. City, Ala. R2 .....6.30‡
Ashland, Ky. A10 .....6.30‡
Canton, O. R2 .....6.30‡
Dover, O. R1 .....6.30‡
Dravosburg, Pa. U5 ....6.30‡
Fairfield, Ala. T2 .....6.30‡
Gary, Ind. U5 .....6.30‡
GraniteCity, Ill. G4 ....6.50*
Ind. Harbor, Ind. I-2 ..6.30‡
Kokomo, Ind. C16 .....6.40‡
MartinsFerry, O. W10 ..6.30*
Middletown, O. A10 ....6.30‡
Pittsburg, Calif. C11 ..7.05*
Pittsburgh J5 .....6.30‡
SparrowsPt., Md. B2 ..6.30‡
Warren, O. R2 .....6.30‡
Weirton, W. Va. W6 ....6.30*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Wall Casing

Fontana, Calif. K1 ....6.975

SHEETS, Galvanized
High-Strength Low-Alloy

Dravosburg, Pa. U5 ...9.275
SparrowsPoint (39) B2..9.275

SHEETS, Galvannealed Steel

Canton, O. R2 .....6.70
Dravosburg, Pa. U5 ....6.70
Kokomo, Ind. C16 .....7.00

SHEETS, Galvanized Ingot Iron
(Hot-dipped Continuous)

Ashland, Ky. A10 .....6.55
Middletown, O. A10 ....6.55

SHEETS, Electrogalvanized

Cleveland (28) R2 ....7.125
Niles, O. (28) R2 .....7.125
Weirton, W. Va. W6 ....6.975

SHEETS, Aluminum Coated

Butler, Pa. A10 (type 1) 8.95
Butler, Pa. A10 (type 2) 9.05

SHEETS, Enameling Iron

Ashland, Ky. A10 .....6.325
Cleveland R2 .....6.325
Dravosburg, Pa. U5 ....6.325
Gary, Ind. U5 .....6.325
GraniteCity, Ill. G4 ....6.525
Ind. Harbor, Ind. I-2, Y1 6.325
Middletown, O. A10 ....6.325
Niles, O. M21 .....6.325
Youngstown Y1 .....6.325

BLUED STOCK, 29 Gage

Follansbee, W. Va. F4 ..8.35
Ind. Harbor, Ind. I-2 ....8.175
Yorkville, O. W10 .....8.175

SHEETS, Long Terne Steel
(Commercial Quality)

BeechBottom, W. Va. W10 6.70
Gary, Ind. U5 .....6.70
Mansfield, O. E6 .....6.70
Middletown, O. A10 ....6.70
Niles, O. M21 .....6.70
Weirton, W. Va. W6 ....6.70

SHEETS, Long Terne, Ingot Iron

Middletown, O. A10 ....7.10

Key To Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Chain Steel Co.
A7 American Steel & Wire Div., U.S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Bath. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Dearborn Division Sharon Steel Corp.
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-5 Interlake Iron Corp.
I-6 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Division, Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.

N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U.S. Steel Corp.
N5 Nelson Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest. SteelRoll. Mill
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Follak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div., EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div. Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn. Coal & Iron Div., U.S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U.S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U.S. Steel Supply Div., U.S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co., Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.675
Allenport,Pa. P7	4.675
Alton,Ill. L1	4.675
Ashland,Ky.(8) A10	4.675
Atlanta A11	4.675
Bessemer,Ala. T2	4.675
Birmingham C15	4.975
Bridgeport,Conn. N19	4.625
Buffalo(27) R2	4.675
Conshohocken,Pa. A3	4.725
Detroit M1	4.775
Ecorse,Mich. G5	4.775
Fairfield,Ala. T2	4.675
Fontana,Calif. K1	5.475
Gary,Ind. U5	4.675
Houston S5	4.925
Ind.Harbor,Ind. I-2, Y1	4.675
Johnstown,Pa.(25) B2	4.675
KansasCity,Mo. S5	4.925
Lackaw'na,N.Y.(25) B2	4.675
LosAngeles(25) B3	5.425
Minnequa,Colo. C10	5.775
Pittsburg,Calif. C11	5.425
Riverdale,Ill. A1	4.675
SanFrancisco S7	5.90
Seattle(25) B3	5.675
Seattle N14	5.675
Sharon,Pa. S3	4.675
S.Chicago,Ill. W14	4.675
S.SanFrancisco(25) B3	5.425
SparrowsPoint,Md. B2	4.675
Sterling,Ill.(1) N15	4.675
Sterling,Ill. N15	4.775
Torrance,Calif. C11	5.425
Warren,O. R2	4.675
Weirton,W.Va. W6	4.675
Youngstown U5	4.675

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19	7.50
Carnegie,Pa. S18	7.75
Dravosburg,Pa. U5	7.75
Gary,Ind. U5	7.75
Ind.Harbor,Ind. Y1	7.75
LosAngeles B3	8.95
Newport,Ky. N9	7.75
Sharon,Pa. S3	7.75
S.Chicago,Ill. W14	7.75
Youngstown U5, Y1	7.75

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2	6.95
Conshohocken,Pa. A3	6.95
Ecorse,Mich. G5	7.05
Fairfield,Ala. T2	6.95
Gary,Ind. U5	6.95
Houston S5	7.20
Ind.Harbor,Ind. I-2, Y1	6.95
KansasCity,Mo. S5	7.20
Lackawanna,N.Y. B2	6.95
LosAngeles(25) B3	7.70
Seattle(25) B3	7.95
Sharon,Pa. S3	6.95
S.SanFrancisco(25) B3	7.70
SparrowsPoint,Md. B2	6.95
Warren,O R2	6.95
Weirton,W.Va. W6	6.95
Youngstown U5, Y1	6.95

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.925
Warren,O. R2	5.425

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.85
Baltimore T6	6.85
Boston T6	7.40
Buffalo S40	6.85
Cleveland A7, J5	6.85
Conshohocken,Pa. A3	6.90
Dearborn,Mich. D3	6.95
Detroit D2, M1, P29	6.95
Dover,O. O6	6.85
Ecorse,Mich. G5	6.95
Follansbee,W.Va. F4	6.85
Fontana,Calif. K1	8.60
Franklin Park,Ill. T6	6.95
Ind.Harbor,Ind. Y1	6.85
Indianapolis C8	7.00
LosAngeles C1	8.80
NewBedford,Mass. R10,	7.30
NewBritain(10) S15	6.85
NewCastle,Pa. B4, E5	6.85
NewHaven,Conn. D2	7.30
NewKensington,Pa. A6	6.85
Pawtucket,R.I. R3	7.50
Pawtucket,R.I. N8	7.40
Pittsburgh J5	6.85
Riverdale,Ill. A1	6.95
Rome,N.Y.(32) R6	6.85
Sharon,Pa. S3	6.85
Trenton,N.J.(31) R5	8.30
Wallingford,Conn. W2	7.30
Warren,O. R2, T5	6.85
Weirton,W.Va. W6	6.85
Worcester,Mass. A7	7.40
Youngstown C8, Y1	6.85

STRIP, Cold-Rolled Alloy

Boston T6	14.90
Carnegie,Pa. S18	14.85
Cleveland A7	14.55
Dover,O G6	14.55
FranklinPark,Ill. T6	14.55
Harrison,N.J. C18	14.55
Indianapolis C8	14.70
Pawtucket,R.I. N8	14.90
Sharon,Pa. S3	14.55
Worcester,Mass. A7	14.85
Youngstown C8	14.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.00
Dearborn,Mich. D3	10.10
Dover,O. G6	10.10
Ecorse,Mich. G5	10.10
Ind.Harbor,Ind. Y1	10.20
Sharon,Pa. S3	10.00
Warren,O. R2	10.00
Weirton,W.Va. W6	10.20
Youngstown Y1	10.20

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	8.50	10.10	12.90	15.30	18.25
Boston T6	8.50	10.10	12.90	15.30	18.25
Bristol,Conn. W1	...	...	12.90	15.30	18.25
Carnegie,Pa. S18	...	9.80	12.60	15.00	....
Cleveland A7	7.95	9.80	12.60	15.00	17.95
Cleveland C7	...	9.80	12.60	15.00	17.95
Dover,O. G6	7.95	9.80	12.60	15.00	17.95
Detroit D2	8.05	9.90	12.70	15.10	....
Dearborn,Mich. D3	8.05	9.90	12.10	....	....
FranklinPark,Ill. T6	8.05	9.80	12.60	15.00	17.95
Harrison,N.J. C18	....	....	12.90	15.30	18.25
Indianapolis C8	8.10	9.85	12.60	15.00	17.95
NewBritain,Conn.(10) S15	7.95	9.80	12.60	15.00	17.95
NewCastle,Pa. B4, E5	7.95	9.80	12.60	15.00	....
NewHaven,Conn. D2	8.40	10.10	12.20	15.30	....
NewKensington,Pa. A6	7.95	9.80	12.60	15.00	....
NewYork W3	...	10.10	12.90	15.30	18.25
Pawtucket,R.I. N8	8.50	10.10	12.90	15.30	18.25
Riverdale,Ill. A1	8.05	9.80	12.00	15.00	17.95
Rome,N.Y.(32) R6	7.95	9.80	12.60	15.00	17.95
Sharon,Pa. S3	7.95	9.80	12.60	15.00	17.95
Trenton,N.J. R5	...	10.10	12.90	15.30	18.25
Wallingford,Conn. W2	8.40	10.10	12.90	15.30	18.15
Warren,O. T5	7.95	9.80	12.60	15.00	17.95
Weirton,W.Va. W6	7.95	9.80	12.60	15.00	17.95
Worcester,Mass. A7,	8.50	10.10	12.30	15.30	18.25
Worcester,Mass. T6	8.50	10.10	12.90	15.30	18.25
Youngstown C8	7.95	9.80	12.60	15.00	17.95

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	18.80	20.65	....
Buffalo W12	18.80	....	....
FranklinPark,Ill. T6	17.15	21.00	25.35
Harrison,N.J. C18	18.80	20.65	25.00
NewYork W3	18.80	20.65	25.00
Palmer,Mass. W12	18.80	....	....
Trenton,N.J. R5	18.80	20.65	25.00
Worcester,Mass A7, J6	18.80	20.65	25.00
Youngstown C8	17.15	21.00	25.35

STRIP, Hot-Rolled Ingot Iron

Warren,O. R2	7.60

STRIP, Electrogalvanized

Cleveland A7	6.85*
Dover,O. G6	6.85*
Riverdale,Ill. A1	6.95*
Warren,O. B9, T5	6.85*
Worcester,Mass. A7	7.40*
Youngstown C8	6.85*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	6.975

TIGHT COOPERAGE HOOP

Atlanta A11	5.40
Riverdale,Ill. A1	5.25
Sharon,Pa. S3	5.10
Youngstown U5	5.10

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	11.00	12.05	13.05
Brackenridge,Pa. A4	...	...	11.00	12.05	13.05
Mansfield,O. E6	9.20	10.35	11.00	12.05	13.05
Newport,Ky. N9	9.20	10.35	11.00	12.05	13.05
Niles,O. M21	9.20	10.35	11.00	12.05	....
Vandergrift,Pa. U5	...	10.35	11.00	12.05	13.05
Warren,O. R2	9.20	10.35	11.00	12.05	....
Zanesville,O. A10	...	10.35	11.00	12.05	13.05
Zanesville,O. A10 (FP coils)	...	10.35	11.525	12.575	13.55
Zanesville,O. A10 (SP coils)	...	....	11.025	12.075	13.05

C.R. COILS & CUT LENGTHS, (22 Ga.)

Fully Processed (Semiprocessed ½t lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	...	....	11.525	12.575	13.55
GraniteCity,Ill. G4	9.40*	10.55*	11.225*12.275*	....	....
IndianaHarbor,Ind. I-3	9.20†	10.35*	11.025*12.075*	....	....
Mansfield O. E6	9.70	10.85	11.525	12.575	13.55
Vandergrift,Pa. U5	9.20*	10.35*	11.025*12.075*	13.05*	
Vandergrift,Pa. U5	...	10.85†	11.525†12.575†	13.55†	
Warren,O. R2	9.20*	10.85	11.525	12.575	13.55

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grades T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	14.05	14.60	15.10	16.15
Brackenridge,Pa. A4	14.05	....	....	....
Vandergrift,Pa. U5	14.05	14.60	15.10	16.15
Zanesville,O. A10	14.05	14.60	15.10	16.15

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	16.90	18.50	19.00	19.50	14.05**
Butler,Pa. A10	....	....	....	18.50	19.00	19.50	....
Vandergrift,Pa. U5	15.90	16.90	18.50	19.00	19.50	14.55**
Warren,O. R2	....	....	....	....	....	....	14.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.40	$8.65	$8.85
Dravosburg,Pa. U5	8.40	8.65	9.05
Fairfield,Ala. T2	8.50	8.75	9.15
Fairless,Pa. U5	8.50	8.75	9.15
Fontana,Calif. K1	9.15	9.40	9.80
Gary,Ind. U5	8.40	8.65	9.05
GraniteCity,Ill. G4	8.50	8.75	9.15
IndianaHarbor,Ind. I-2, Y1	8.40	8.65	9.05
Niles,O. R2	8.40	8.65	9.05
Pittsburg,Calif. C11	9.15	9.40	9.80
SparrowsPoint,Md. B2	8.50	8.75	9.15
Weirton,W.Va. W6	8.40	8.65	9.05
Yorkville,O. W10	8.40	8.65	9.05

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	7.425	....	....
Niles,O. R2	7.425	7.625	7.825

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.70	$9.95
Dravosburg,Pa. U5	9.70	9.95
Fairfield,Ala. T2	9.80	10.05
Fairless,Pa. U5	9.80	10.05
Fontana,Calif. K1	10.45	10.70
Gary,Ind. U5	9.70	9.95
Ind. Harbor Y1	9.70	9.95
Pitts.,Calif. C11	10.45	10.70
Sp.Pt.,Md. B2	9.80	10.05
Weirton,W.Va. W6	9.70	9.95
Yorkville,O. W10	9.70	9.95

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$7.50
Dravosburg,Pa. U5	7.50
Fairfield,Ala. T2	7.60
Fairless,Pa. U5	7.60
Fontana,Calif. K1	8.25
Gary,Ind. U5	7.50
GraniteCity,Ill. G4	7.60
Ind.Harbor,Ind. I-2, Y1	7.50
Niles,O. R2	7.50
Pittsburg,Calif. C11	8.25
SparrowsPoint,Md. B2	7.60
Weirton,W.Va. W6	7.50
Yorkville,O. W10	7.50

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	$7.15
Dravosburg,Pa. U5	7.15
Gary,Ind. U5	7.15
GraniteCity,Ill. G4	7.25
Ind.Harbor,Ind. Y1	7.15
Yorkville,O. W10	7.15

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5	$9.20
Gary,Ind. U5	9.20

ROOFING SHORT TERNES (8 lb Coated; Base Box)

Gary,Ind. U5	$10.75

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	7.20
Aliquippa,Pa. J5	7.20
Alton,Ill. L1	7.40
Atlanta A11	7.40
Bartonville,Ill. K4	7.30
Buffalo W12	7.20
Chicago W13	7.20
Cleveland A7, C20	7.20
Crawfordsville,Ind. M8	7.30
Donora,Pa. A7	7.20
Duluth A7	7.20
Fairfield,Ala. T2	7.20
Fostoria,O (24) S1	7.30
Houston S5	7.45
Jacksonville,Fla. M8	7.55
Johnstown,Pa. B2	7.20
Joliet,Ill. A7	7.20
KansasCity,Mo. S5	7.45
Kokomo,Ind. C16	7.30
LosAngeles B3	8.15
Minnequa,Colo. C10	7.45
Monessen,Pa. P7, P16	7.20
N.Tonawanda,N.Y. B11	7.20
Palmer,Mass. W12	7.50
Pittsburg,Calif. C11	8.15
Portsmouth,O. P12	7.20
Rankin,Pa. A7	7.20
S.Chicago,Ill. R2	7.20
S.SanFrancisco C10	8.15
SparrowsPoint,Md. B2	7.30
Sterling,Ill.(1) N15	7.20
Sterling,Ill. N15	7.30
Struthers,O Y1	7.20
Waukegan,Ill. A7	7.20
Worcester,Mass. A7	7.50

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4	11.75
Buffalo W12	11.75
Johnstown,Pa. B2	11.75
Minnequa,Colo. C10	11.875
Monessen,Pa. P16	11.75
Muncie,Ind. I-7	11.95
Palmer,Mass. W12	12.05
Pittsburg,Calif. C11	12.85
Portsmouth,O. P12	11.75
Roebling,N.J. R5	12.05
SparrowsPt.,Md. B3	11.85
Struthers,O. Y1	11.75

ROPE WIRE (A)

Bartonville,Ill. K4	11.55
Buffalo W12	11.55
Fostoria,O. S1	11.55
Johnstown,Pa. B2	11.55
Monessen,Pa. P7, P16	11.55
Muncie,Ind. I-7	11.75
Palmer,Mass. W12	11.85
Portsmouth,O. P12	11.55
Roebling,N.J. R5	11.85
SparrowsPt.,Md. B2	11.65
Struthers,O. Y1	11.55
Worcester,Mass. J4	11.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE, Upholstery Spring

Aliquippa,Pa. J5	8.40
Alton,Ill. L1	8.60
Buffalo W12	8.40
Cleveland A7	8.40
Donora,Pa. A7	8.40
Duluth A7	8.40
Johnstown,Pa. B2	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.35
Minnequa,Colo. C10	8.60
Monessen,Pa. P7, P16	8.40
NewHaven,Conn. A7	8.70
Palmer,Mass. W12	8.70
Pittsburg,Calif. C11	9.35
Portsmouth,O. P12	8.40
Roebling,N.J. R5	8.70
S.Chicago,Ill. R2	8.40
S.SanFrancisco C10	9.35
SparrowsPoint,Md. B2	8.50
Struthers,O. Y1	8.40
Trenton,N.J. A7	8.70
Waukegan,Ill. A7	8.40
Worcester,Mass. A7	8.70

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	8.725
Alton,Ill. L1	8.925
Bartonville,Ill. K4	8.825
Buffalo W12	8.725
Cleveland A7	8.725
Donora,Pa. A7	8.725
Duluth A7	8.725
Fostoria,O. S1	8.775
Johnstown,Pa. B2	8.725
LosAngeles B3	9.675
Milbury,Mass.(12) N6	9.025
Minnequa,Colo. C10	8.975
Monessen,Pa. P7, P16	8.725
Muncie,Ind. I-7	8.925
Palmer,Mass. W12	9.025
Pittsburg,Calif. C11	9.675
Portsmouth,O. P12	8.725
Roebling,N.J. R5	9.025
S.Chicago,Ill. R2	8.725
S.SanFrancisco C10	9.675
SparrowsPt.,Md. B2	8.825
Struthers,O. Y1	8.725
Trenton,N.J. A7	9.025
Waukegan,Ill. A7	8.725
Worcester A7, J4, T6	9.025

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1	14.35
Bartonville,Ill. K4	14.25
Buffalo W12	14.15
Chicago W13	13.85
Cleveland A7	14.15
Crawfordsville,Ind. M8	14.25
Fostoria,O. S1	14.15
Jacksonville,Fla. M8	14.50
Johnstown,Pa. B2	14.15
Kokomo,Ind. C16	14.15
Minnequa,Colo. C10	13.90
Monessen,Pa. P6	14.15
Muncie,Ind. I-7	14.35
Palmer,Mass. W12	14.45
Roebling,N.J. C10	14.45
S.SanFrancisco C10	14.50
Waukegan,Ill. A7	14.15
Worcester,Mass. A7, T6	14.45

WIRE

WIRE, Tire Bead

Bartonville,Ill. K4	15.25
Monessen,Pa. P16	14.45
Roebling,N.J. R5	15.60

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	10.75
Baltimore T6	11.05
Boston T6	11.05
Buffalo W12	10.75
Cleveland A7	10.75
Crawfordsville,Ind. M8	10.75
Dover,O. G6	10.75
Fostoria,O. S1	10.75
Franklin Park,Ill. T6	10.85
Kokomo,Ind. C16	10.75
Massillon,O. R8	10.75
Milwaukee C23	10.95
Monessen,Pa. P7, P16	10.75
New Kensington,Pa. A6	10.75
Palmer,Mass. W12	11.05
Pawtucket,R.I. N8	11.05
Riverdale,Ill. A1	10.85
Rome,N.Y. R6	10.75
Trenton,N.J. R5	11.05
Worcester,Mass. A7, T6	11.05

NAILS & POLISHED STAPLES, Stock / Col.

Alabama City,Ala. R2	164
Aliquippa,Pa. (7) J5	167
Atlanta A11	166
Bartonville,Ill. (7) K4	169
Crawfordsville,Ind. M8	166
Donora,Pa. A7	164
Duluth A7	164
Fairfield,Ala. T2	164
Houston,Tex. S5	169
Jacksonville,Fla.(20) M8	175
Johnstown,Pa. B2	164
Joliet,Ill. A7	164
Kansas City,Mo. S5	169
Kokomo,Ind. C16	166
Minnequa,Colo. C10	169
Monessen,Pa. (7) P7	167
Pittsburg,Calif. C11	153
Rankin,Pa. A7	164
S.Chicago,Ill. R2	164
Sparrows Pt.,Md. B2	166
Sterling,Ill. (1) N15	164
Worcester,Mass. A7	170

NAILS, Stock / Col.

Chicago (7) W13	167
Cleveland (7) A9	173

(To Wholesalers; per cwt)

Galveston,Tex. D7	$3.75

NAILS, Cut (100 lb bag) To Dealers (33)

Conshohocken,Pa. A3	$9.80
Wheeling,W.Va. W10	9.80

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box) Coil No. / 3150

Alabama City,Ala. R2	$9.53
Atlanta A11	9.63
Bartonville,Ill. K4	10.13
Buffalo W12	10.05
Crawfordsville,Ind. M8	9.63
Donora,Pa. A7	9.53
Duluth A7	9.53
Houston S5	9.78
Jacksonville,Fla. M8	10.09
Johnstown,Pa. B2	9.53
Joliet,Ill. A7	9.53
Kansas City,Mo. S5	9.78
Kokomo,Ind. C16	9.63
Los Angeles B3	10.32
Minnequa,Colo. C10	9.78
Pittsburg,Calif. C11	10.31
S.Chicago,Ill. R2	9.53
S.San Francisco C10	10.31
Sparrows Pt.,Md. B2	9.63
Sterling,Ill.(1) N15	9.53

Coil No. 6500 Stand.

Alabama City,Ala. R2	$9.85
Atlanta A11	9.95
Bartonville,Ill. K4	10.45
Buffalo W12	10.35
Crawfordsville,In. M8	9.95
Donora,Pa. A7	9.85
Duluth A7	9.85
Houston S5	10.10
Kokomo,Ind. C16	9.95
Jacksonville,Fla. M8	10.41
Johnstown,Pa. B2	9.85
Joliet,Ill. A7	9.85
Kansas City,Mo. S5	10.10
Kokomo,Ind. C16	10.45
Los Angeles B3	10.65
Minnequa,Colo. C10	10.10
Pittsburg,Calif. C11	10.65
S.Chicago,Ill. R2	9.85
S.San Francisco C10	10.65
Sparrows Pt.,Md. B2	9.95
Sterling,Ill.(1) N15	9.85

Coil Interim

Alabama City,Ala. R2	$9.90
Atlanta A11	10.00
Bartonville,Ill. K4	10.50
Buffalo W12	10.40
Crawfordsville,Ind. M8	10.00
Donora,Pa. A7	9.90
Duluth A7	9.90
Houston S5	10.15
Jacksonville,Fla. M8	10.46
Johnstown,Pa. B2	9.90
Joliet,Ill. A7	9.90
Kansas City,Mo. S5	10.15
Kokomo,Ind. C16	10.00
Los Angeles B3	10.70
Minnequa,Colo. C10	10.15
Pittsburg,Calif. C11	10.70
S.Chicago,Ill. R2	9.90
S.San Francisco C10	10.70
Sparrows Pt.,Md. B2	10.00
Sterling,Ill.(1) N15	9.90

WIRE, Barbed / Col.

Alabama City,Ala. R2	184**
Aliquippa, Pa. J5	184‡
Atlanta A11	190*
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	190
Donora,Pa. A7	184†
Duluth A7	184†
Fairfield,Ala. T2	184†
Houston,Tex. S5	189**
Jacksonville,Fla. M8	195
Johnstown,Pa. B2	188*
Joliet,Ill. A7	184†
Kansas City,Mo. S5	189**
Kokomo,Ind. C16	186†
Minnequa,Colo. C10	189**
Monessen,Pa. P7	191*
Pittsburg,Calif. C11	204†
Rankin,Pa. A7	184†
S.Chicago,Ill. R2	188**
S.San Francisco C10	207**
Sparrows Point,Md. B2	190*
Sterling,Ill.(1) N15	188*

WOVEN FENCE, 9-15 Ga. / Col.

Ala.City,Ala. R2	176**
Aliq'ppa,Pa. 9-14½ga.J5	184‡
Atlanta A11	182*
Bartonville,Ill. K4	187
Crawfordsville,Ind. M8	182
Donora,Pa. A7	176†
Duluth A7	176†
Fairfield,Ala. T2	176†
Houston,Tex. S5	181**
Jacksonville,Fla. M8	187
Johnstown,Pa.(43) B2	180*
Joliet,Ill. A7	176†
Kansas City,Mo. S5	181**
Kokomo,Ind. C16	178†
Minnequa,Colo. C10	181**
Monessen,Pa. 9 ga. P7	185*
Pittsburg,Calif. C11	199†
Rankin,Pa. A7	176†
S.Chicago,Ill. R2	176**
Sterling,Ill.(1) N15	180*

WIRE (16 gage)	**An'ld Stone**	**Galv. Stone**
Ala.City,Ala.R2	15.70	17.25**
Bartonville K4	16.10	18.95
Buffalo W12	16.10	
Cleveland A7	15.70	17.25†
Crawf'dsville M8	15.80	17.75
Fostoria,O. S1	16.20	17.75†
Houston S5	15.95	17.50**
Jacksonville M8	16.05	18.00
Johnstown B2	16.10	18.05*
Kan.City,Mo.S5	15.95	17.50**
Kokomo C16	15.80	17.35†
Minnequa C10	16.05	17.75**
P'im'r,Mass.W2	16.10	17.65*
Pitts.,Calif. C11	16.05	17.60†
Sparrows Pt. B2	16.20	18.15*
Sterling(1) N15	16.10	18.05*
Waukegan A7	15.70	17.25†
Worcester A7	16.00	

WIRE, Merchant Quality (6 to 8 gage)	**An'ld**	**Galv.**
Ala.City,Ala. R2	7.95	8.35**
Aliquippa J5	8.10	8.625‡
Atlanta A11	8.05	8.65*
Bartonville(48) K4	8.20	8.80
Buffalo W12	8.10	8.50†
Cleveland A7	7.95	
Crawfordsville M8	8.05-8.65	
Donora,Pa. A7	7.95	8.35†
Duluth A7	7.95	8.35†
Fairfield T2	7.95	8.35†
Houston(48) S5	8.20	8.60**
Jacks'ville,Fla. M8	8.80	8.90
Johnstown B2(48)	7.95	8.55*
Joliet,Ill. A7	7.95	8.35†
Kans.City(48) S5	8.20	8.60**
Kokomo C16	8.05	8.45†
Los Angeles B3	8.90	9.50*
Minnequa, C10	8.20	8.60**
Monessen P7 (48)	8.10	8.70*
Palmer,Mass. W12	8.40	8.80*
Pitts.,Calif. C11	8.90	9.30†
Portsmouth,O. P12	7.95	
Rankin,Pa. A7	7.95	8.35†
S.Chicago R2	7.95	8.35**
S.San Fran. C10	8.90	9.30**
Spar'wsPt. B2(48)	8.05	8.65*
Sterling(1)(48) N15	7.95	8.55*
Struth'rs,O.(48) Y1	7.95	8.40‡
Worcester,Mass. A7	8.25	8.65†

Based on zinc price of: *13.50c. †5c. ‡10c. §Less than 10c. ††13. **Subject to zinc equalization extras.

BALE TIES, Single Loop / Col.

Alabama City,Ala. R2	190
Atlanta A11	192
Bartonville,Ill. K4	197
Crawfordsville,Ind. M8	192
Donora,Pa. A7	190
Duluth A7	190
Fairfield,Ala. T2	190
Houston S5	195
Jacksonville,Fla. M8	197
Joliet,Ill. A7	190
Kansas City,Mo. S5	195
Kokomo,Ind. C16	192
Minnequa,Colo. C10	195
Pitts.,Calif. C11	214
S.Chicago,Ill. R2	190
S.San Francisco C10	214
Sparrows Point,Md. B2	192
Sterling,Ill. N15	190
Tonawanda,N.Y. B12	169
Williamsport,Pa. S19	175

FENCE POSTS

Chicago Ifts.,Ill. C2, I-2	167
Duluth A7	167
Franklin,Pa. F5	167
Huntington,W. Va. W7	169
Johnstown,Pa. B2	167
Marion,O. P11	167
Minnequa,Colo. C10	172
Sterling,Ill. N15	167
Tonawanda,N.Y. B12	169
Williamsport,Pa. S19	175

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts
Full Size Body (cut thread)

½ in. and smaller;	
6 in. and shorter	55
Longer than 6 in.	46.5
⅝ in. thru 1 in.:	
6 in. and shorter	46.5
Longer than 6 in.	44
1¼ in. and larger:	
All lengths	44

Undersized Body (rolled thread)

½ in. and smaller:	
6 in. and shorter	55

Carriage, Machine, Lag Bolts

Hot Galvanized:

½ in. and smaller:	
6 in. and shorter	35
Longer than 6 in.	23
⅝ in. thru 1 in.:	
6 in. and shorter	20
Longer than 6 in.	20
1¼ in. and larger:	
All lengths	20

Lag Bolts

All diameters:	
6 in. and shorter	55
Longer than 6 in.	47

Plow and Tap Bolts

½ in. and smaller by 6 in. and shorter	54
Larger than ½ in. or longer than 6 in.	47
Blank Bolts	47
Step, Elevator, Tire Bolts	54

NUTS

Reg. & Heavy Square Nuts:

All sizes	59

Square Nuts, Reg. & Heavy, Hot Galvanized:

All sizes	45

Hex Nuts, Reg. & Heavy, Hot Pressed:

⅝ in. and smaller	63
⅞ in. to 1 in. incl.	59.5
1⅛ in. to 1⅜ in., incl.	64
1⅜ in. and larger	58

Hex Nuts, Reg. & Heavy, Cold Punched:

⅝ in. and smaller	63
⅞ in. to 1⅛ in., incl.	59.5
1⅛ in. and larger	58

Hex Nuts, All Types, Hot Galvanized:

⅝ in. and smaller	50
⅞ in. to 1 in., incl.	46
1⅛ in. to 1⅜ in., incl.	51

Hex Nuts, Semifinished, Reg. & Heavy (Incl. Slotted):

⅝ in. and smaller	63
⅞ in. to 1⅛ in., incl.	59.5
1⅜ in. and larger	58

Hex Nuts, Finished (Incl. Slotted and Castellated):

1 in. and smaller	65
1⅛ in. to 1⅜ in., incl.	62
1⅜ in. and larger	58

CAP AND SET SCREWS
(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Cap Screws, Coarse or Fine Thread

Bright:

6 in. and shorter:	
⅝ in. and smaller	47
⅝, ⅞ and 1 in. diam.	31
Longer than 6 in.:	
⅝ in. and smaller	18.5
⅝, ⅞ and 1 in. diam.	5.5

High Carbon, Heat Treated:

6 in. and shorter:	
⅝ in. and smaller	34
⅝, ⅞ and 1 in. diam.	13
Longer than 6 in.:	
⅝ in. and smaller	+1
⅝, ⅞ and 1 in. diam.	+19

Fillister Head, Coarse Thread:

Listed Sizes	+31

Flat Head, Coarse Thread:

¼ in. and smaller	
6 in. and shorter	+57

Set Screws, Square Head, Cap Point, Coarse Thread:

Through 1 in. diam.:	
6 in. and shorter	11
Longer than 6 in.	+10

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 10.85
$\frac{7}{16}$-in. under List less 26.5%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	23.56	22.84
1¼	13	....	27.92	22.68
1½	13	26.34	30.86	25.06
1¾	13	31.12	36.45	29.64
2	13	34.88	40.85	33.21
2¼	13	39.29	46.01	37.42
2½	12	42.64	49.94	40.61
2⅝	12	46.98	55.01	44.73
2¾	12	50.86	59.57	48.44
3	12	54.24	63.53	51.66

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All	Tee Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	5.075	4.975	5.025	6.00
Ensley,Ala. T2	5.075	4.975	....	6.00
Fairfield,Ala. T2	....	....	....	6.00
Gary,Ind. U5	5.075	4.975	5.025	....
Huntington,W. Va. W7	....	....	....	6.15
Indiana Harbor,Ind. I-2	5.075	4.975	5.025	....
Johnstown,Pa. B2	....	....	....(16)	6.00
Lackawanna,N.Y. B2	5.075	4.975	....(16)	6.00
Minnequa,Colo. C10	5.075	4.975	....	6.50
Steelton,Pa. B2	5.075	4.975	....	....
Williamsport,Pa. S19	....	....	....	6.15

TIE PLATES	
Fairfield,Ala. T2	6.025
Gary,Ind. U5	6.025
Ind.Harbor,Ind. I-2	6.025
Lackawanna,N.Y. B2	6.025
Minnequa,Colo. C10	6.025
Seattle B3	6.175
Steelton,Pa. B2	6.025
Torrance,Calif. C11	6.175
JOINT BARS	
Bessemer,Pa. U5	6.35
Fairfield,Ala. T2	6.35
Ind.Harbor,Ind. I-2	6.35
Joliet,Ill. U5	6.35
Lackawanna,N.Y. B2	6.35
Minnequa,Colo. C10	6.35
Steelton, Pa. B2	6.35
AXLES	
Ind.Harbor,Ind. H13	8.10
Johnstown,Pa. B2	8.10

TRACK BOLTS, Untreated	
Cleveland R2	13.10
Lebanon,Pa. B2	13.10
Minnequa,Colo. C10	13.10
Pittsburgh P14	13.10
Seattle B3	13.60
SCREW SPIKES	
Cleveland R2	12.85
Pittsburgh P14	12.85
STANDARD TRACK SPIKES	
Fairfield,Ala. T2	8.775
Ind.Harbor,Ind. I-2, Y1	8.775
Kansas City,Mo. S5	8.775
Lebanon,Pa. B2	8.775
Minnequa, Colo. C10	8.775
Pittsburgh J5	8.775
Seattle B3	9.275
S.Chicago,Ill. R2	8.775
Struthers,O. Y1	8.775
Youngstown R2	8.775

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1¼ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 0.23c; 1 15/16 to 4 in.; inclusive, 0.60c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 2.25c for 17 Ga. & heavier.
(14) Gage 0.142 to 0.249 in.; for gage 0.142 and lighter, 5.90c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.35 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.685c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝-in.; 7.95c, for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.40c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(48) 6-7 Ga.
(49) 2¼-in. and smaller rounds; 8.65c, over 2½-in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8
Ambridge, Pa. N2	+2	....	4.5	....	7	....	8.5	....	8.5	....	8.25	....	10.75	....
Lorain, O. N3	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8
Youngstown Y1	0.5	+17.5	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Alton, Ill. L1	....	....	....	....	....	....	10.5	+3.75	13.5	+4.75	16	+1.25	18.5	0.5
Benwood, W. Va. W10	10	+20.5	+6.25	+27.75	+9.75	+37.25	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Butler, Pa. F6	10	+20.5	0.5	+27	+8.5	+36	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Fairless, Pa. N3	....	....	....	....	....	....	10.5	+8.75	13.5	+4.75	16	+1.25	18.5	0.5
Fontana, Calif. K1	....	....	....	....	....	....	0	+19.25	3	+15.25	5.5	+11.75	8	+10
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	11.5	+7.75	14.5	+3.75	17	+0.25	19.5	1.5
Lorain, O. N3	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Sharon, Pa. S4	11	+19.5	1.5	+26	+7.5	+35	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Sparrows Pt., Md. B2	9	+21.5	0.5	+28	+9.5	+37	10.5	+8.75	13.5	+4.75	16	+1.25	18.5	0.5
Wheatland, Pa. W9	11	+19.5	1.5	+26	+7.5	+35	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Youngstown R2, Y1	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5

Size—Inches	1¼		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Alton, Ill. L1	19	1.5	19.5	2	21	2.75	21	2.75	....	....	....	....
Benwood, W. Va. W10	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+0.75	13.5	+5.25
Etna, Pa. N2	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+5.25	13.5	+5.25
Fairless, Pa. N3	19	1.5	19.5	2	21	2.75	21	2.75	11.5	+7.25	11.5	+7.25
Fontana, Calif. K1	8.5	+9	9	+8.5	10.5	+7.75	10.5	+7.75	1	+17.75	1	+17.75
Indiana Harbor, Ind. Y1	20	2.5	20.5	3	22	3.75	22	3.75	12.5	+6.25	12.5	+6.25
Lorain, O. N3	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Sharon, Pa. M6	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Sparrows Pt., Md. B2	19	1.5	19.5	2	21	2.75	21	2.75	11	+7.25	11	+7.25
Wheatland, Pa. W9	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+5.25	13.5	+5.25
Youngstown R2, Y1	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+5.25	13.5	+5.25

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	*21.25*	*26.00*		*34.50*			*46.75*	*47.25*	
202	*22.75*	*29.00*	*35.00*	*37.50*	*39.25*	*41.25*	*43.25*	*47.25*	*47.25*
301	*22.25*	*27.00*	*35.75*	*35.75*	*40.25*	*42.50*	*44.50*	*49.25*	*45.75*
302	*24.25*	*30.25*	*36.50*	*39.00*	*41.00*	*43.25*	*45.50*	*50.00*	*50.00*
302B	*24.50*	*31.50*	*39.25*	*44.00*	*43.25*	*45.50*	*47.50*	*54.75*	*54.75*
303		*30.75*	*39.50*		*44.00*	*46.25*	*48.00*	*54.50*	*54.50*
304	*26.00*	*32.00*	*39.00*	*42.50*	*43.75*	*46.00*	*48.75*	*53.25*	*53.25*
304L			*46.50*	*49.50*	*51.25*	*53.50*	*56.25*	*60.75*	*60.75*
305	*27.50*	*35.25*	*40.75*	*45.75*	*43.75*	*46.00*	*49.25*	*56.50*	*56.50*
308	*29.50*	*36.75*	*45.50*	*48.25*	*50.75*	*53.50*	*58.00*	*60.50*	*60.50*
309	*38.25*	*47.50*	*55.50*	*62.00*	*61.25*	*64.50*	*68.25*	*77.50*	*77.50*
310	*47.75*	*59.25*	*75.00*	*81.00*	*83.25*	*87.50*	*89.25*	*93.00*	*93.00*
314					*83.25*		*80.25*		
316	*38.25*	*47.50*	*59.75*	*66.50*	*66.75*	*70.25*	*73.75*	*78.25*	*78.25*
316L			*67.25*	*73.00*	*74.25*	*77.25*	*81.25*	*85.75*	*85.75*
317	*46.25*	*57.75*	*73.75*	*84.75*	*83.00*	*87.25*	*90.00*	*97.00*	*97.00*
18-8 CbTa	*55.50*	*44.75*	*53.50*	*61.00*	*59.25*	*62.25*	*67.00*	*76.25*	*76.25*
18-8CbTa	32.75	42.00	50.25	56.25	56.25	59.00	63.75	73.00	73.00
403	....	....	30.75	....	34.50	36.25	38.75	46.50	46.50
405	18.75	24.50	28.50	34.50	32.50	34.00	36.00	45.00	45.00
410	16.00	20.75	27.25	29.75	31.00	32.50	33.75	38.75	38.75
416	....	....	27.75	....	31.50	33.00	34.75	46.50	46.50
420	....	32.25	33.00	40.25	37.75	39.75	43.50	59.50	59.50
430	16.25	21.00	27.75	30.75	31.50	33.00	34.50	39.25	39.25
430F	....	....	28.25	....	32.00	33.50	35.25	49.75	49.75
431	....	*27.75*	*36.25*		*40.25*	*42.50*	*44.25*	*51.75*	*51.75*
446	....	....	37.75	56.75	42.50	44.75	46.00	67.25	67.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Div., H. K. Porter Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U.S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; National-Standard Co.; National Tube Div., U.S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates— Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	33.25
304	....	34.50	....	41.50	35.25
304-L	....	37.20	....	44.65	....
316	....	38.70	....	46.65	52.25
316-L	....	45.70	....	54.35	....
316-CB	....	45.90	....	54.75	....
321	....	36.35	....	43.40	42.00
347	....	39.50	....	48.45	51.00
405	....	29.20	....	37.05	....
410	....	28.70	....	36.55	....
430	....	28.70	....	36.55	....
Inconel	*47.28*	*57.90*	*68.50*	*79.20*	....
Nickel	*40.00*	*50.10*	*60.65*	*71.05*	....
Nickel, Low Carbon	*40.10*	*50.95*	*61.65*	*72.50*	....
Monel	*41.70*	*51.90*	*62.15*	*72.40*	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	34.40	40.65

*Deoxidized. Production points: Stainless-clad sheets New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.290	Cr Hot Work	0.45-0.495
Extra Carbon	0.345	W-Cr Hot Work	0.043-0.675
Special Carbon	0.41-0.45	V-Cr Hot Work	0.460
Oil Hardening	0.450	Hi-Carbon-Cr	0.830

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	....	4.170
18.25	4.25	1	4.75	....	2.385
18	4	2	9	....	2.7575
18	4	2	....	....	1.845
18	4	1	....	....	1.660
9	3.5	..	....	....	1.275
13.5	4	3	....	....	1.945
13.75	3.75	2	5	....	2.325
6.4	4.5	1.9	....	5	1.185
6	4	3	....	6	1.430
1.5	4	1	....	8.5	1.040

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, M16, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malleable	Bessemer
AlabamaCity,Ala. R2	58.50	59.00	....	....
Birmingham R2	58.50	59.00†	....	....
Birmingham U6	....	59.00‡	63.00	....
Woodward,Ala. W15	58.50	59.00‡	63.00	....
Cincinnati, deld.	....	66.70	....	....
Buffalo District				
Buffalo H1, R2	62.50	63.00	63.50	64.00
Tonawanda,N.Y. W12	62.50	63.00	63.50	64.00
N.Tonawanda,N.Y. T9	....	63.00	63.50	64.00
Boston, deld.	73.79	74.29	74.79	....
Rochester,N.Y., deld.	65.52	66.02	66.52	....
Syracuse,N.Y., deld.	66.62	67.12	67.62	....
Chicago District				
Chicago I-3	62.50	63.00	63.00	63.50
Gary,Ind. U5	62.50	....	63.00	....
S.Chicago,Ill. R2	62.50	....	63.00	....
S.Chicago,Ill. Y1	62.50	63.00	63.00	....
S.Chicago,Ill. U5	62.50	....	63.00	63.50
S.Chicago,Ill. W14	62.50	....	63.00	63.50
Milwaukee, deld.	64.80	65.30	65.30	65.80
Muskegon,Mich., deld.	....	69.68	69.68	....
Cleveland District				
Cleveland R2, A7	62.50	63.00	63.00	63.50
Akron,O., deld.	65.25	65.75	65.75	66.25
Mid-Atlantic District				
Bethlehem,Pa. B2	64.50	65.00	65.50	66.00
NewYork, deld.	....	69.01	69.51	....
Newark,N.J., deld.	67.79	68.29	68.79	69.29
Birdsboro,Pa. B10	64.50	65.00	65.50	66.00
Chester,Pa. P4	64.50	65.00	65.50	....
Philadelphia, deld.	66.26	66.76	67.26	....
Steelton,Pa. B2	64.50	65.00	65.50	66.00
Swedeland,Pa. A3	64.50	65.00	65.50	66.00
Philadelphia, deld.	66.26	66.76	67.26	67.76
Troy,N.Y. R2	64.50	65.00	65.50	66.00
Pittsburgh District				
NevilleIsland,Pa. P6	62.50	63.00	63.00	63.50
Pittsburgh (N&S sides), Aliquippa, deld.	....	64.45	64.45	64.98
McKeesRocks,Pa. deld.	....	64.10	64.10	64.63
Lawrenceville, Homestead, Wilmerding, Monaca,Pa., deld.	....	64.76	64.76	65.29
Verona, Trafford,Pa., deld	64.79	65.32	65.32	65.85
Brackenridge,Pa., deld.	65.10	65.60	65.60	66.13
Bessemer,Pa. U5	62.50	....	63.00	63.50
Clairton,Rankin,S.Duquesne,Pa. U5	62.50	....	....	....
Midland,Pa. C18	62.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malleable	Bessemer
Hubbard,O. Y1	....	....	63.00	....
Sharpsville,Pa. S6	62.50	....	63.00	63.50
Youngstown Y1	....	....	63.00	63.50
Mansfield,O., deld.	67.40	....	67.90	68.40
Duluth I-3	62.50	63.00	63.00	63.50
Erie,Pa. I-3	62.50	63.00	63.00	63.50
Everett,Mass. E1	*64.50*	*65.00*	*65.50*	....
Fontana,Calif. K1	70.00	70.50	....	....
Geneva,Utah C11	62.50	63.00	....	....
GraniteCity,Ill. G4	64.40	64.90	65.40	....
Ironton,Utah C11	62.50	63.00	....	....
LoneStar,Tex. L6	58.50*	59.00†	....	....
Minnequa,Colo. C10	64.50	65.00	65.50	....
Rockwood,Tenn. T3	....	59.00‡	63.00	....
Toledo,O. I-3	62.50	63.00	63.00	63.50
Cincinnati, deld.	68.26	68.76	....	....

*Phos. 0.51-0.75%; Phos. 0.31-0.50%, $59.50.
†Phos. 0.51-0.75%; Phos. 0.31-0.50%, $60.
‡Phos. 0.70-0.90%; intermediate (Phos. 0.31-0.69%), $60.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.25 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. I-3, J1	71.50
Buffalo H1	72.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$97.50
NiagaraFalls,N.Y. P15	97.50
Keokuk,Iowa, Open-hearth & Fdry, freight allowed K2	*110.00*
Keokuk, O.H. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	*113.00*

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$76.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	76.50
Steelton,Pa. B2 (Phos. 0.035% max)	70.50
Philadelphia, deld.	74.05
Troy,N.Y. R2 (Phos. 0.035% max)	70.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	67.50

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: St. Paul, 25 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, Spokane, 10 cents; Atlanta, Houston, Seattle no charge.

	SHEETS				STRIP	BARS				Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Merchant Qual.	H.R. Spec. Qual.	C.F. Rds.§	H.R. Alloy 4140††‡		Carbon	Floor
Atlanta	8.07‖	9.27‖	9.83‖	....	8.16	8.30	...	10.14	....	8.44	8.40	10.22
Baltimore	7.79	8.99	9.12	....	8.27	8.34	8.87	9.09[3]	15.69	8.57	8.12	10.81
Birmingham	7.68‖	8.88‖	8.85‖	....	7.78	7.91	8.44	10.04	....	8.05	8.01	10.04
Boston	8.70	9.73	11.02	....	8.79	8.88	9.43	10.71	14.45	8.90	8.98	10.39
Buffalo	7.75	8.90	10.72	....	8.00	8.00	8.70	8.70	14.30	8.25	8.25	9.80
Chattanooga	7.90‖	9.10‖	9.10‖	....	8.00	8.13	8.66	9.96	....	8.27	8.23	9.98
Chicago	7.70	8.90	9.70	....	7.78	7.91	8.44	8.35	13.95	8.05	8.01	9.26
Cincinnati	7.82	8.89	9.75	....	8.06	8.19	8.72	8.82	14.23	8.55	8.34	9.53
Cleveland	7.68	8.88	9.60	....	7.88	7.99	8.52	8.60	14.03	8.38	8.21	9.46
Denver	9.55	11.09	12.41	....	9.70	9.75	...	10.54	16.89	9.60	9.50	11.15
Detroit	7.91	9.13	10.02	....	8.10	8.18	8.71	8.68	14.19	8.55	8.33	9.49
Erie, Pa.	7.75	8.88	9.60[16]	....	7.90	8.00	8.65	8.70[16]	....	8.35	8.20	9.50
Houston	8.70	9.65	10.99	....	8.80	8.95	9.50	10.55	15.00	8.90	8.80	10.10
Jackson, Miss.	8.00‖	9.20‖	9.22‖	....	8.10	8.23	8.76	10.14	....	8.37	8.33	10.08
Los Angeles	8.90	10.65	11.65	....	9.10	8.80	9.50	11.70	15.25	8.95	9.35	11.50
Milwaukee	7.82	9.02	9.82	....	7.90	8.03	8.56	8.57	14.07	8.24	8.13	9.38
Moline, Ill.	8.05	9.25	10.05	....	8.13	8.26	...	8.70	....	7.78	8.36	...
New York	8.35	9.53	10.23	57.73	8.81	8.83	9.36	10.61	14.37	8.74	8.78	10.05
Norfolk, Va.	7.85	...	...	....	8.30	8.35	...	10.80	....	8.60	8.10	9.60
Philadelphia	7.89	9.08	10.12	....	8.58	8.37	8.90	9.12	14.15	8.38	8.28	9.37
Pittsburgh	7.68	8.88	10.05	50.00	7.88	7.91	8.44	8.60	13.95	8.05	8.01	9.26
Portland, Oreg.	8.90	9.65	11.40	....	9.05	8.95	...	13.55	14.60	8.90	8.70	11.60
Richmond, Va.	8.05	...	10.09	....	8.45	8.70	9.20	10.00	....	8.80	8.35	9.70
St. Louis	8.02	9.21	10.03	....	8.11	8.25	8.78	8.93	14.28	8.48	8.34	9.59
St. Paul	8.29	9.49	10.31	....	8.39	8.52	...	9.21	....	8.75	8.71	9.87
San Francisco	8.75	10.30	10.80	....	8.95	8.80	9.35	12.30	15.25	8.85	8.85	11.15
Seattle	9.35	10.45	11.55	....	9.50	9.30	9.85	13.15	15.55	9.15	9.05	11.25
Spokane, Wash.	9.35	10.50	11.55	....	9.50	9.30	9.85	13.15	16.30	9.15	9.05	11.25
Washington	8.37	10.57	...	....	9.06	8.92	...	9.67	....	9.15	8.70	10.14

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50c zinc at Los Angeles and 13.50c at other points), except in Birmingham (coating extra excluded); ‡includes 35-cent bar quality extras; **⅜-in. and heavier; ††as annealed; §42 in. and under.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 6000 lb except in Chicago, New York and Boston, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [3]—400 to 999 lb; [5]—1000 to 1999 lb; [6]—2000 to 2999 lb; [16]—2000 lb and over.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton. Palmerton, Pa. 21-23% Mn, $102; 19-21% Mn, 1-3% Si, $99.50; 16-19% Mn, $97.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $235, Johnstown, Duquesne, Sheridan, Pa.; $255, Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%). Lump $223 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 23.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn, packed, carload 26.8c, ton lot 28.4c, less ton 29.6c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min Fe 2% max, Si 1% max, C 0.2% max). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 33c; 2000 lb to min carload, 35c; 500 lb to 1999 lb, 37c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 13.8c per lb of alloy. Packed, c.l. 15c, ton 15.45c, less ton 16.45c, f.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37 f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $235 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk 27.75c per lb of contained Cr; c.l. packed 29.3c, ton lot 31.05c; less ton 32.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 34.75c per lb contained Cr, 0.02% max 41.5c, 0.03% max 41c, 0.06% max 39.5c, 0.1% max 39c, 0.15% max 38.75c, 0.2% max 38.5c, 0.5% max 38.25c, 1.0% max 37.5c, 1.5% max 37.35c, 2.0% max 37.25c. Ton lot, add 3.4c, less ton add 5.1c. Carload packed add 1.75c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l., 2 in. x D, bulk 29.05c per lb contained Cr. Packed, c.l. 30.65c, ton 32.45c, less ton 33.95c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8 M x D, 20.85c, per lb of alloy, ton lot 22.10c; less ton lot 23.3c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk 41.35c per lb of contained Cr; 1" x down, bulk 42.35c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.29 per lb, ton lots $1.31, less ton lots $1.33. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 6, 65c; No. 79, 58c, freight allowed.

Vanadium Oxide: Contract, less carload lots, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 13.9c per lb of contained Si. Packed c.l. 14.4c, ton lot 17.85c, less ton 19.5c, f.o.b. Alloy, W. Va., Ashtabula, Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.55c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 15.25c per pound contained silicon. Packed, c.l. 17.25c, ton lot, 19.05c; less ton 20.4c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 16.4c per lb of contained Si. Packed, c.l. 18.30c, ton lot 19.95c, less ton 21.2c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 19.5c per lb of contained Si. Packed, c.l. 21.15c, ton lot 22.55c, less ton 23.8c. Delivered. Spot, add 0.25c.

Silicon Metal: (Mn 98% Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Bortam: (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carloads 9.50c per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3½ lb each and containing 2 lb of Cr). Contract, carload, bulk, 19c per lb of briquet, carload packed in box pallets 19.2c, in bags 20.1c; 3000 lb to c.l. in box pallets 20.4c; 2000 lb to c.l. in bags, 21.3c; less than 2000 lb in bags 22.2c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing 2 lb of Mn). Contract, carload, bulk 14.8c per lb of briquet, c.l. packed pallets 15c, bags 16c; 3000 lb to c.l., pallets 16.2c; 2000 lb to c.l. bags, 17.2c, less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 15.1c per lb of briquet, c.l. packed, pallets, 15.3c; bags 16.3c, 3000 lb to c.l., pallets, 16.5c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing 2 lb of Si). Contract, carload, bulk, 7.7c per lb of briquet, packed, pallets, 7.9c; bags 8.9c; 3000 lb to c.l., pallets 9.5c; 2000 lb to c.l. bags 10.5c; less ton 11.4c. Delivered. Spot, add 0.25c. (Small size—weighing approx. 2½ lb and containing 1 lb of Si). Carload, bulk 7.8c. Packed, pallets 8.05c; bags 9.05c; 3000 lb to c.l. pallets 9.65c; 2000 lb to c.l. bags 10.65c; less ton 11.55c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.41 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.15 per lb of contained W; 2000 lb W to 4999 lb W, $3.25; less than 2000 lb W, $3.37. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $4.95 per lb of contained Cb plus Ta, delivered; less ton lots $5.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, c.l. packed ½-in. x 12 M 19c per lb of alloy, ton lots 20.15c, less ton 21.4c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 19c per lb of alloy, ton lots 20.15c; less ton lots 21.4c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-S Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.1c per lb of alloy; ton lots 19.55c; less ton lots 20.8c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 18.50c. Packed c.l. 19.50c, 2000 lb to c.l. 20.50c, less than 2000 lb 21c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.68 in all sizes except powdered which is $1.76.

Technical Molybdic-Oxide: Per lb contained Mo in cans, $1.39; in bags, $1.35, f.o.b. Langeloth and Washington, Pa.

Ores

Lake Superior Iron Ore

(Prices effective for the 1956 shipping season, gross tons, 51.50% iron natural, rail or vessel, lower lake ports.)

Old range bessemer	$11.25
Old range nonbessemer	11.10
Mesabi bessemer	11.00
Mesabi nonbessemer	10.85
Open-hearth lump	12.10
High phos.	10.85

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Dec. 1, 1955, and increases or decreases after such date are for seller's account.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	25.00
N. African hematite (spot)	nom. 24.00-25.00
Brazilian iron ore, 68-69%	33.00-34.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$28.50-29.00
Domestic, concentrates, mine	59.00

Manganese Ore

Mn 46-48%, Indian (export tax included), $1.60-1.70 per long ton unit, c.i.f. U.S. ports, duty for buyer's account; other than Indian, $1.45-1.50; contracts by negotiation.

Chrome Ore

Gross ton f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$54.00-57.00
48% 2.8:1	51.00-54.00
48% no ratio	43.00-45.00

South African Transvaal

48% no ratio	$37.50-39.00
44% no ratio	26.00-27.00

Turkish

48% 3:1	$66.00-63.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.18

Antimony Ore

Per unit of 8lb content, c.i.f. seaboard

55-60%	$3.35-3.80
60-65%	3.80-3.90

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $128; Salina, Pa., $133; Niles, O., $138; Cutler, Utah, $148.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $165; Stevens Pottery, Ga., $175.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $140; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $145; E. Chicago, Ind., Joliet, Rockdale, Ill., $150; Lehigh, Utah, $165; Los Angeles, $170.

Super-Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Latrobe, Pa., $160; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $145; Woodbridge, N. J., $128; Philadelphia, $130.

Ladle Brick (per 1000)

Dry Pressed: Aisey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $96; Clearfield, Pa., Portsmouth, O., $98.

High-Alumina Brick (per 1000)

50 Per Cent: St. Louis, Mexico, Vandalia, Mo., $220; Danville, Ill., $223; Philadelphia, Clearfield, Pa., $230.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Narlo, O., $16; Thornton, McCook, Ill., $16.35; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ⅛-in. grains with fines: Chewelah, Wash., Luning, Nev. $43; ⅝-in. grains with fines: Baltimore, $69.40.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $177; Clearfield, Pa., $189.

Metallurgical Coke

Price per net ton

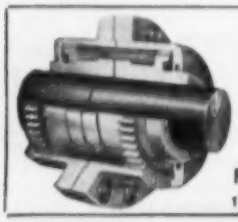
Beehive Ovens

Connellsville, furnace	$14.50-15.50
Connellsville, foundry	17.50-18.50

Oven Foundry Coke

Birmingham, ovens	$27.60
Cincinnati, deld.	32.53
Buffalo, ovens	29.50
Camden, N.J., ovens	28.50
Detroit, ovens	29.50
Pontiac, deld.	31.15
Saginaw, deld.	32.73
Erie, Pa. ovens	29.50
Everett, Mass., ovens	
New England, deld.	30.55*
Indianapolis, ovens	28.75
Ironton, O., ovens	28.00
Cincinnati, deld.	28.25
Kearny, N.J., ovens	28.75
Lone Star, Tex., ovens	25.50
Milwaukee, ovens	29.50
Painesville, O., ovens	29.50
Cleveland, deld.	31.55
Philadelphia, ovens	28.50
St. Louis, ovens	28.50
Neville Island (Pittsburgh), Pa., ovens	28.25
St. Paul, ovens	28.50
Chicago, deld.	31.82
Swedeland, Pa., ovens	28.50
Terre Haute, Ind., ovens	28.75

*Or within $4.55 freight zone from works.



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Easier Tone Develops in Scrap

Market undertone is softer at several points and STEEL's composite on the steelmaking grades slips to $64.50 in the absence of representative buying over the holidays

Scrap Prices, Page 92

Pittsburgh—No. 2 bundles are being shipped to a plant in this area for $52 on the basis of a contract last week, but prices of other principal grades are unchanged. The $52 price represents a $2 decline. It coincides with downtrends of $1 a ton in turnings and borings and cut structurals.

Warm weather, higher prices and the desire of some scrap collectors to accumulate cash before the holiday season have brought out a good volume of scrap since early this month. Brokers expect scrap supply to tighten again in January.

Philadelphia—The scrap market undertone is not quite as strong as it was a week ago. Prices are generally unchanged, with no real easing in prospect. Bolstering sentiment is the prospect that two cargoes of steel scrap, involving 18,000 tons, will leave this port in January. Cupola cast iron is quoted higher on buying by leading pipe foundries, the spread now being $54-$56, delivered.

Buffalo—Holiday dullness prevails in the market here. Dealers are shipping against outstanding orders but do not appear anxious to book new business until the turn of the year. Prices are unchanged. But some traders sense a somewhat easier tone in the market despite light supplies and high-level consumption. Open weather so far this winter has aided the movement of scrap.

Chicago—New purchases of several important grades of steelmaking scrap have pegged prices about $2 a ton below those that had been prevailing. The odds are that the market will close out the year pretty much without further price adjustment. Steel ingot production was scheduled at capacity over the holidays.

Cleveland—Scrap traders anticipate little new buying until after the New Year's holiday. Prices are holding, and the market undertone continues strong despite signs of an easing tendency at some other market centers. The outcome of bidding on auto lists at month's end is seen as influencing the price trend in the open market for January.

Cincinnati—There have been no representative transactions in the scrap market to fix a price pattern. But, there is some evidence of weakness, and brokers think the next price movement, probably in January, will be downward. Brokers continue to quote $62-$63 for No. 1 heavy melting steel.

Birmingham — The market is quiet. Open-hearth scrap consumers are not buying and the electric furnaces and foundries are ordering only sufficient material to replace tonnage taken from stocks. The export market continues strong.

Seattle—The scrap market here continues firm at $54 and $51 for No. 1 and No. 2 heavy melting steel. Receipts are in good volume; inventories are fair; and buyers are actively covering their needs. Exporters continue to book new business from Japan.

Los Angeles—Prices are steady, but the market undertone is softer. Dealers say more scrap is available now than at any time since the end of last summer's steel strike.

Iron Ore . . .

Iron Ore Prices, Page 90

The last vessel to pass through the Soo locks and close the 1956 Great Lakes navigation season was the *Philip R. Clarke* of the Pittsburgh Steamship Division, U.S. Steel Corp. The season had been extended beyond the usual Dec. 1 closing and was the longest in 33 years. The *Clarke* brought down 16,900 tons of ore from Two Harbors, Minn.

Pig Iron . . .

Pig Iron Prices, Page 88

Keokuk Electro - Metals Co., Keokuk, Iowa, increased its prices on electric furnace silvery pig iron $8 a gross ton, effective Dec. 15. This makes the base price on 14.01-14.5 per cent silicon grade $110.

Based on operating fourth quarter costs, Mystic Iron Works has increased its January-March prices $1.25 per gross ton to $65 f.o.b. Everett, Mass. furnace.

November pig iron production was 6,977,457 net tons, bringing the total for the first 11 months to 68,019,062 tons. November production of ferromanganese and spiegeleisen was 58,614 tons; for the first 11 months, 598,500 tons. Total blast furnace production amounted to 7,036,071 tons in November and 68,617,562 tons for the first 11 months.

Blast furnace operations in November were at a rate of 100.1 per

(*Please turn to page 97*)

Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Dec. 26	$64.50
Dec. 19	64.83
Nov. Avg.	61.83
Dec. 1955	50.37
Dec. 1951	43.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	66.00-67.00
No. 2 heavy melting	58.00-59.00
No. 1 bundles	66.00-67.00
No. 2 bundles	*51.00-52.00*
No. 1 busheling	66.00-67.00
Machine shop turnings	*43.00-44.00*
Mixed borings, turnings	*43.00-44.00*
Short shovel turnings	*47.00-48.00*
Cast iron borings	*47.00-48.00*
Cut structurals, 3 ft. lengths	*72.00-73.00*
Heavy turnings	59.00-60.00
Punchings & plate scrap	*72.00-73.00*
Electric furnace bundles	*72.00-73.00*

Cast Iron Grades

No. 1 cupola	54.00-55.00
Heavy breakable cast	52.00-53.00
Unstriped motor blocks	40.00-41.00
No. 1 machinery cast	61.00-62.00

Railroad Scrap

No. 1 R.R. heavy melt.	71.00-72.00
Rails, 2 ft and under	81.00-82.00
Rails, 18 in. and under	82.00-83.00
Rails, random lengths	79.00-80.00
Railroad specialties	75.00-76.00

Stainless Steel Scrap

18-8 bundles & solids	480.00-520.00
18-8 turnings	400.00-420.00
430 bundles & solids	110.00-120.00
430 turnings	80.00-85.00

CLEVELAND

No. 1 heavy melting	64.50-65.50
No. 2 heavy melting	50.00-51.00
No. 1 bundles	64.50-65.50
No. 2 bundles	44.00-45.00
No. 1 busheling	64.50-65.50
Machine shop turnings	35.00-36.00
Mixed borings, turnings	38.00-39.00
Short shovel turnings	38.00-39.00
Cast iron borings	38.00-39.00
Cut foundry steel	62.00-63.00
Low phos.	65.50-66.50
Cut structural plates 2 ft and under	71.00-72.00
Alloy free, short shovel turnings	42.00-44.00
Electric furnace bundles	65.50-66.50

Cast Iron Grades

No. 1 cupola	59.00-60.00
Charging box cast	52.00-53.00
Heavy breakable cast	50.00-51.00
Stove plate	55.00-56.00
Unstripped motor blocks	39.00-40.00
Brake shoes	47.00-48.00
Clean auto cast	57.00-58.00
Burnt cast	44.00-45.00
Drop broken machinery	60.00-61.00

Railroad Scrap

No. 1 R.R. heavy melt.	68.00-69.00
R.R. malleable	71.00-72.00
Rails, 2 ft and under	86.00-87.00
Rails, 18 in. and under	87.00-88.00
Rails, random lengths	83.00-84.00
Cast steel	71.00-72.00
Railroad specialties	77.00-78.00
Uncut tires	76.00-77.00
Angles, splice bars	78.00-79.00
Rails, rerolling	85.00-86.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	480.00-500.00
18-8 turnings	300.00-310.00
430 clips, bundles, solids	115.00-120.00
430 turnings	85.00-85.00

YOUNGSTOWN

No. 1 heavy melting	66.00-67.00
No. 2 heavy melting	57.00-58.00
No. 1 bundles	66.00-67.00
No. 2 bundles	49.00-50.00
No. 1 busheling	66.00-67.00
Machine shop turnings	36.00-37.00
Short shovel turnings	43.00-44.00
Cast iron borings	43.00-44.00
Low phos.	68.50-69.50
Electric furnace bundles	68.50-69.50

Railroad Scrap

No. 1 R.R. heavy melt.	69.00-70.00

CHICAGO

No. 1 heavy melting	*62.00-66.00*
No. 2 heavy melting	*50.00-52.00*
No. 1 factory bundles	67.00-69.00
No. 1 dealer bundles	*61.00-62.00*
No. 2 bundles	*45.00-47.00*
No. 1 busheling	64.00-66.00
Machine shop turnings	39.00-40.00
Mixed borings, turnings	41.00-42.00
Short shovel turnings	41.00-42.00
Cast iron borings	41.00-42.00
Cut structurals, 3 ft	*70.00-71.00*
Punchings & plate scrap	*71.00-72.00*

Cast Iron Grades

No. 1 cupola	50.00-51.00
Stove plate	45.00-47.00
Unstripped motor blocks	39.00-40.00
Clean auto cast	55.00-56.00
Drop broken machinery	55.00-56.00

Railroad Scrap

No .1 R.R. heavy melt.	69.00-70.00
R.R. malleable	70.00-71.00
Rails, 2 ft and under	*86.00-87.00*
Rails, 18 in. and under	*87.00-88.00*
Angles, splice bars	*77.00-78.00*
Rails, rerolling	89.00-90.00

Stainless Steel Scrap

18-8 bundles & solids	505.00-515.00
18-8 turnings	355.00-375.00
430 bundles & solids	105.00-110.00
430 turnings	80.00-85.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	59.00
No. 2 heavy melting	49.00
No. 1 bundles	60.00
No. 2 bundles	40.00
No. 1 busheling	59.00
Machine shop turnings	31.00
Mixed borings, turnings	33.00
Short shovel turnings	34.00
Punchings & plate scrap	61.00-65.00

Cast Iron Grades

No. 1 cupola	49.00
Charging box cast	43.00
Stove plate	45.00
Heavy breakable	44.00
Unstripped motor blocks	32.00
Clean auto cast	54.00
Malleable	54.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*56.00*
No. 2 heavy melting	47.50
No. 1 bundles	*56.00*
No. 2 bundles	44.00
No. 1 busheling	*56.00*
Machine shop turnings	36.00
Short shovel turnings	38.50

Cast Iron Grades

No. 1 cupola	*50.00*
Charging box cast	*45.50*
Heavy breakable cast	*45.50*
Unstripped motor blocks	*45.50*
Brake shoes	51.00
Clean auto cast	53.00
Stove plate	*43.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*66.00*
Rails, 18 in. and under	85.00
Rails, rerolling	*86.00*
Rails, random lengths	*80.00*
Angles, splice bars	*70.00*

PHILADELPHIA

No. 1 heavy melting	63.00
No. 2 heavy melting	*54.00-56.00*
No. 1 bundles	63.00
No. 2 bundles	52.00-54.00
No. 1 busheling	63.00
Electric furnace bundles	65.00-66.00
Mixed borings, turnings	45.00-46.00
Machine shop turnings	45.00-46.00
Short shovel turnings	*49.00*
Heavy turnings	58.00-59.00
Structurals & plates	68.00-70.00
Couplers, springs, wheels	74.00
Rails, crops, 2 ft & under	82.00-83.00

Cast Iron Grades

No. 1 cupola	*54.00-56.00*
Malleable	68.00
Heavy breakable cast	59.00
Drop broken machinery	60.00-61.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	58.00
No. 2 heavy melting	48.00-49.00
No. 1 bundles	58.00
No. 2 bundles	46.00-47.00
Machine shop turnings	36.00-37.00
Mixed borings, turnings	35.00-36.00
Short shovel turnings	41.00-41.50
Low phos. (structural & plate)	59.00-60.00

Cast Iron Grades

No. 1 cupola	46.00-47.00
Unstripped motor blocks	38.00-39.00
Heavy breakable	50.00-51.00

Stainless Steel

18-8 heets, clips, solids	475.00-485.00
18-8 borings, turnings	335.00-360.00
420 sheets, clips, solids	110.00-115.00
410 sheets, clips, solids	100.00-105.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*51.50-52.00*
No. 2 heavy melting	*41.00-41.50*
No. 1 bundles	*51.50-52.00*
No. 2 bundles	*40.50-41.00*
No. 1 busheling	*51.50-52.00*
Machine shop turnings	*33.50-34.00*
Mixed borings, turnings	*34.00-34.50*
Short shovel turnings	*37.50-38.00*
No. 1 cast	*44.50-45.50*
Mixed cupola cast	*42.00-43.00*
No. 1 machinery cast	*45.00-46.00*

BUFFALO

No. 1 heavy melting	62.00-63.00
No. 2 heavy melting	52.00-53.00
No. 1 bundles	62.00-63.00
No. 2 bundles	48.00-49.00
No. 1 busheling	62.00-63.00
Mixed borings, turnings	38.00-39.00
Machine shop turnings	39.00-40.00
Short shovel turnings	43.00-44.00
Cast iron borings	34.00-35.00
Low phos.	65.00-66.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	49.00-50.00
No. 1 machinery	54.00-55.00

Railroad Scrap

Rails, random lengths	71.00-72.00
Rails, 3 ft and under	77.00-78.00
Railroad specialties	70.00-71.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	62.00-63.00
No. 2 heavy melting	52.00-53.00
No. 1 bundles	62.00-63.00
No. 2 bundles	46.00-47.00
No. 1 busheling	62.00-63.00
Machine shop turnings	41.50-42.50
Mixed borings, turnings	39.50-40.50
Short shovel turnings	43.50-44.50
Cast iron borings	39.50-40.50
Low phos. 18 in.	68.00-69.00

Cast Iron Grades

No. 1 cupola	48.00-49.00
Heavy breakable cast	47.00-48.00
Charging box cast	48.00-49.00
Drop broken machinery	59.00-60.00

Railroad Scrap

No. 1 R.R. heavy melt.	64.00-65.00
Rails, 18 in. and under	82.00-83.00
Rails, random lengths	74.00-75.00

BIRMINGHAM

No. 1 heavy melting	46.00-47.00
No. 2 heavy melting	44.00-45.00
No. 1 bundles	46.00-47.00
No. 2 bundles	38.00-39.00
No. 1 busheling	46.00-47.00
Cast iron borings	27.00-28.00
Short shovel turnings	40.00-41.00
Machine shop turnings	39.00-40.00
Bar crops and plate	64.00-65.00
Structurals & plate, 2 ft.	63.00-64.00
Electric furnace bundles	56.00-57.00
Cut foundry steel	54.00-55.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	52.00-53.00
Stove plate	51.00-52.00
Unstripped motor blocks	44.00-45.00
Charging box cast	40.00-41.00
No. 1 wheels	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	63.00-64.00
Rails, 18-in. and under	76.00-77.00
Rails, rerolling	82.00-83.00
Rails, random lengths	76.00-77.00
Angles, splice bars	68.00-69.00

SEATTLE

No. 1 heavy melting	54.00
No. 2 heavy melting	51.00
No. 1 bundles	51.00
No. 2 bundles	31.00
Machine shop turnings	28.00-30.00
Mixed borings, turnings	28.00-30.00
Electric furnace No. 1	62.00-65.00

Cast Iron Grades

No. 1 cupola	54.00-56.00
Heavy breakable cast	46.00
Unstripped motor blocks	48.00-50.00
Stove plate (f.o.b. plant)	40.00-42.00

LOS ANGELES

No. 1 heavy melting	55.00
No. 2 heavy melting	54.00
No. 1 bundles	54.00
No. 2 bundles	47.00
Machine shop turnings	32.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	62.00

SAN FRANCISCO

No. 1 heavy melting	55.00
No. 2 heavy melting	52.00
No. 1 bundles	54.00
No. 2 bundles	40.00
Machine shop turnings	35.00
Mixed borings, turnings	35.00
Cast iron borings	35.00
Heavy turnings	35.00
Short shovel turnings	38.00
Cut structurals	62.00

Cast Iron Grades

No. 1 cupola	57.00
Charging box cast	45.00-47.00
Stove plate	48.00
Heavy breakable cast	42.00
Unstripped motor blocks	50.00
Clean auto cast	57.00
No. 1 wheels	48.00
Drop broken machinery	60.00

HAMILTON, ONT.

No. 1 heavy melting	54.00
No. 2 heavy melting	47.00
No. 1 bundles	54.00
No. 2 bundles	40.50
Mixed steel scrap	46.00
Busheling, new factory:	
Prepared	52.00
Unprepared	45.00
Short steel turnings	35.00

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b., Hamilton, Ont.

GREAT MOMENTS IN THE HISTORY OF IRON AND STEEL MAKING

Type of Bessemer Converter used by Goransson at Edsken, Sweden . . . This is the sixteenth in a series of outstanding inventions and developments that have contributed to the progress of the iron and steel industry.

G. F. Goransson

1858 – The First Marketable Steel

The contribution of the Bessemer process to the manufacture of steel might have been endlessly delayed had it not been for a chance meeting in England in 1857 between Bessemer and Goran Fredrik Goransson, a Swedish merchant.

Intrigued by the process, but disappointed with the quality of the steel produced, Goransson set about to achieve a more malleable product. On the seeming verge of failure, he resolved at the last moment to diminish the air pressure instead of increasing it. For his experiment, he put 12 tuyeres in one line at the bottom of the converter and enlarged their diameters to ⅞ of an inch. This did the trick. The temperature of the fluid steel was raised and the resulting ingots were free from slag and extremely malleable. A short time later, additional experiments resulted in the first successful commercially marketable steel.

Today, the most selective grades of scrap help produce America's finest steel. These special steels require scrap of known analysis. We believe our experience, personnel, equipment, and the strategic location of our offices can best help you solve any problem you may have in iron or steel scrap.

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Competition Will Mark '57

The nonferrous industry had a better than average year in '56. Competition among the metals will grow more intense in 1957 as newer metals go after a bigger share of the market

Nonferrous Metal Prices, Pages 96 & 97

INCREASED competition, three-year labor contracts and a striving for price stability were features of the 1956 nonferrous metals scene.

Starting this year, these elements will affect 1957 forecasts and results.

Smooth Sailing—During the first ten days of '56 lead prices jumped from 15.50 to 16.50 cents per pound. A few days later the quotations settled at 16 cents. Lead sales paralleled the price trend. Sales were on a lofty plane all year, with tetraethyl lead and cable makers showing marked gains.

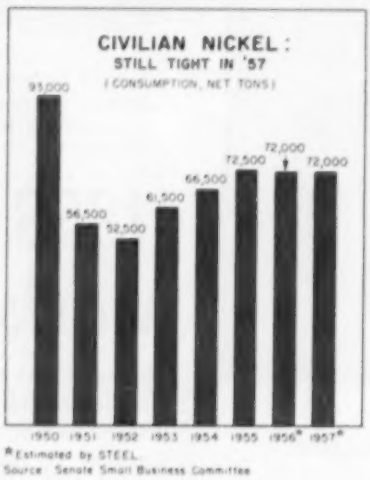
The government's interest in stockpiling lead and zinc kept the price firm. The Agriculture department's barter program will help remove foreign surpluses from the market next year. With government support, both metals should stay at current price levels during the first quarter.

Zinc—It jumped from 13 to 13.50 cents per pound during January and has held firm. As long as the government keeps its interest in stockpiling (when necesary to support producers), zinc prices will hold at present levels. The Eisenhower administration will probably announce some type of guarantee during the early months of '57.

Zinc sales to galvanizers and diecasters will be at a record clip during '57. Soft spot: Consumption by brass mills must show substantial gains to keep up with zinc's two other major markets.

Copper—While red metal prices bounded all over the lot during the year (primary, from 46 to 36 cents a pound; secondary, 54.5 to 35 cents per pound), the current average price of about 35.5 cents is well below the December, 1955, average of 56.05 cents. Fluctuating prices and a sudden drop in demand during the third and fourth quarters gave the industry cause for concern.

Brass mill sales must improve by leaps and bounds during the first quarter if the copper industry



is to have a banner year. Even with the third and fourth quarter drop in demand for the red metal, 1956 may still be the best year for copper. But a continual decline in demand for brass mill products could bring about an average year for the copper industry in 1957. Cable and wire makers should help strengthen the sales outlook, but fierce competition is reducing profit margins.

Forecast: 1957 could be a near record year for the copper industry, but hard selling will have to be the order of the day. A realistic price will be a necessity. Competition will be keen.

Aluminum — Primary ingot prices jumped from 24.40 to 27.10 cents per pound during the year. New labor contracts and the need for expansion dollars (see page 27) brought about the hikes.

With new expansions coming throughout 1957, the industry will set out to further saturate existing markets. Primary ingot and pig prices should hold at current levels during the first quarter. Most producers will be out to get a bigger share of the construction and auto markets.

Titanium—Sponge prices dropped from $3.45 to $2.75 a pound during '56. With each reduction, interest in titanium mounted. Look for civilian applications to show gains (as well as the military) in 1957 as prices decline further.

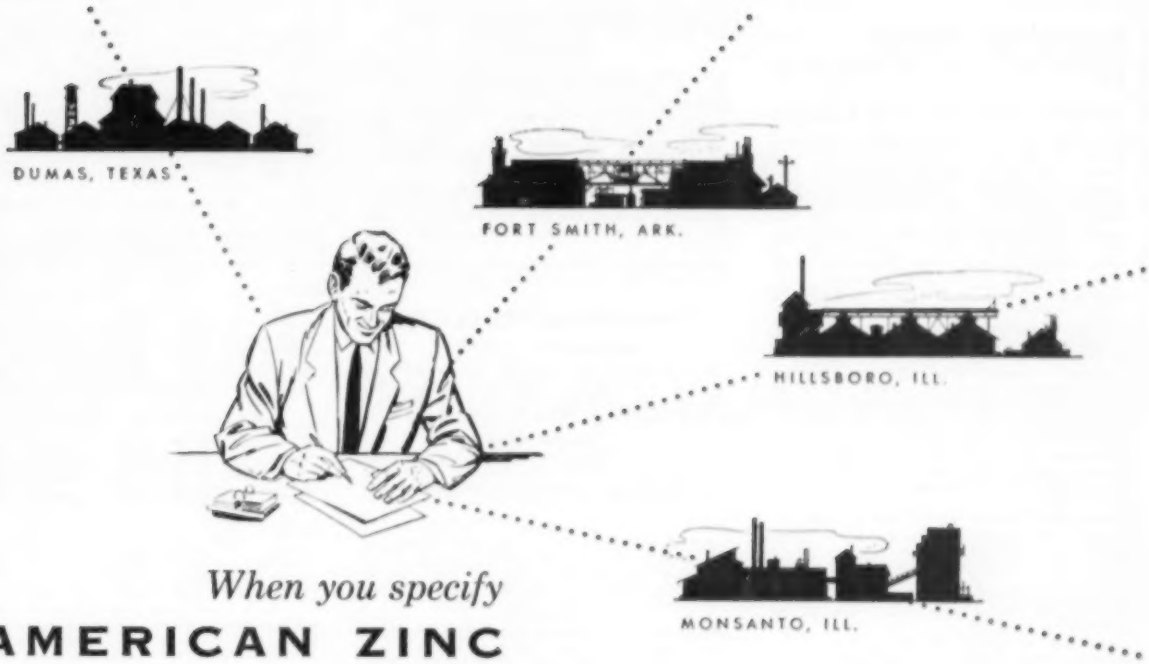
Nickel—One hike of this month (to 74 cents a pound) was the only price flurry. Distribution problems will continue to plague producers and users (see chart). Increasing military needs will keep nickel in short supply during 1957.

Magnesium—Pig prices went from 32.5 cents a pound at the beginning of the year to 35.25 cents at the end. Primary production will touch 68,000 tons this year. Users and potential users point out that a price reduction is needed. Magnesium producers and fabricators explain that volume markets must be developed before prices can take a nose dive.

NONFERROUS PRICE RECORD

	Price Dec. 28	Last Change	Previous Price	Nov. Avg.	Oct. Avg.	Dec., 1955 Avg.
Aluminum ..	27.10	Aug. 10, 1956	25.90	27.100	27.100	24.400
Copper	35.00-36.00	Dec. 19, 1956	35.50-36.00	35.956	38.365	46.053
Lead	15.80	Jan. 13, 1956	16.30	15.800	15.500	15.384
Magnesium .	35.25	Aug. 13, 1956	33.75	35.250	35.250	32.500
Nickel	74.00	Dec. 6, 1956	64.50	64.500	64.500	64.500
Tin	101.50	Dec. 21, 1956	102.00	111.049	105.981	107.980
Zinc	13.50	Jan. 6, 1956	13.50	13.500	13.500	13.000

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.



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AMERICAN ZINC

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4

SOURCES OF SUPPLY

Not just one, but four American Zinc plants are at your service. Under normal conditions each of these plants is prepared to make immediate delivery of slab zinc. If, for any reason one of the plants is unable to fill your order, another one will.

To further assure prompt delivery, and to keep pace with growing demand, production of all grades of zinc, from Prime Western to Electrolytic, has been increased.

You can always count on American Zinc to fill your needs with speed and precision.

HERE'S WHY WE CAN SERVE YOU BETTER

PLANT	BRAND	GRADE
DUMAS, TEXAS	GRANBY D	Prime Western Select Brass Special Continuous Line Galvanizing Grades
FORT SMITH, ARK.	GRANBY A AMERICAN SPECIAL	Prime Western Brass Special
HILLSBORO, ILL.	GRANBY H	High Grade Intermediate Brass Special Prime Western Continuous Line Galvanizing Grades
MONSANTO, ILL.	AMERICAN ELECTROLYTIC	Special High Grade High Grade Special Alloys and Shapes Continuous Line Galvanizing Grades

American Zinc Sales Company

Distributors for AMERICAN ZINC, LEAD & SMELTING COMPANY

COLUMBUS, OHIO • CHICAGO • ST. LOUIS • NEW YORK

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots 27.16; pigs, 25.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.90; No. 43, 28.70; No. 195, 30.30; No. 13, 28.90; No. 43, 28.70; 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 36.00 deld. Conn. valley; 36.00 deld. Midwest; custom smelters, 35.00-36.00 deld.; lake, 36.00 deld.; fire refined, 35.75 deld.

Germanium: First reduction, $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

Gold: U.S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.95; corroding, 15.95, St. Louis. New York basis, add 0.75.

Lithium: 98+%, cups or ingots, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 25.25; ingot, 26.55, f.o.b. Velasco, Tex. 13 in. sticks, 29.00, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91B (diecasting), 37.25 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $255-$257 per 76-lb flask.

Molybdenum: Extruded ingot, $9.60 per pound, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot or ingots for addition to cast iron, 74.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01.

Osmium: $80-$100 per troy oz, nom.

Palladium: $23-$24 per troy oz.

Platinum: $103-$106 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $13.50-$15.50 per lb.

Silver: Open market, 91.375 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $49.70 per lb; powder, $56.43 per lb.

Tellurium: $1.65-$1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot, 101.50; prompt 101.25.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), $2.75; grade A-2 (0.5% Fe max), $3.50 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.20 per lb, nom, f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $5. Treated ingot, $6.70.

Zinc: Prime Western, 13.50; brass special, 13.75; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per pound. New York basis, add 0.50. High grade, 14.85; special high grade, 15.25 deld. Diecasting alloy ingot No. 3, 15.00; No. 2, 19.00; No. 5, 18.50, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $10 per lb; reactor grade, $14-$22 per lb, depending on quantity. Powder electronics grades, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 25.25-30.00; No. 12 foundry alloy (No. 2 grade), 23.50-24.00; 5% silicon alloy, 0.60 Cu max, 26.00-26.25; 13 alloy, 0.60 Cu max, 26.00-26.25; 195 alloy, 26.00-26.50; 108 alloy, 24.00. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.75; grade 2, 23.00, grade 3, 22.25; grade 4, 21.75.

Brass Ingot: Red brass, No. 115, 35.00; tin bronze, No. 225, 46.00; No. 245, 41.50; high-leaded tin bronze, No. 305, 38.50; No. 1 yellow, No. 405, 27.50; manganese bronze, No. 421, 30.75.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 37.50; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nominal 1.9% Be alloy). Strip, $1.86-$1.91, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.88, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 41.355; l.c.l., 41.98. Weatherproof, 30,000-lb lots, 40.78; l.c.l., 41.53. Magnet wire deld., 15,000 lb or more, 48.68; l.c.l., 49.43.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheet and strip, $11.00-$14.75; sheared mill plate, $9.25-$11.25; wire $8.50-$11.00; forging billets, $6.85-$7.10; hot-rolled and forged bars, $7.10-$7.35.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 24.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $20.35; H.R. strip, $23.95; C.R. strip, $32.00; forged or H.R. bars, $18.40; wire, 0.015 in., 8.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	126
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheet and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range, Inches	Flat Sheet	Coiled Sheet
0.249-0.136	40.90-45.45	....
0.135-0.096	41.40-46.50	37.70-39.80
0.095-0.077	42.10-48.50	37.80-39.80
0.076-0.061	42.70-50.60	38.20-40.50
0.060-0.048	42.40-52.90	38.80-41.50
0.047-0.038	43.90-55.60	38.60-42.90
0.037-0.030	44.30-56.00	40.40-44.70
0.029-0.024	44.90-52.40	41.90
0.023-0.019	45.80-52.20	42.00
0.018-0.017	46.60-53.30	42.60
0.016-0.015	47.50-53.90	43.40
0.014	48.50-56.90	44.40
0.013-0.012	49.70-52.10	45.10
0.011	50.70-53.70	46.30
0.010-0.0095	52.10-54.40	47.60
0.009-0.0085	53.40	49.10
0.008-0.0075	55.00	50.03
0.007	56.50	51.80
0.006	58.10	53.20

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	40.2	44.5
5050-F	41.2	45.6
3004-F	42.3	47.5
5052-F	42.9	48.2
6061-T6	44.4	50.9
2024-T4*	48.1	54.4
7075-T6*	55.4	62.5

*28-48 in. widths or diam, 72-180 lengths.

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	74.30	71.50	....	....
0.156-0.172	62.00	60.40	....	....
0.188	62.00	60.40	....	76.40
0.219-0.234	59.70	57.20	....	....
0.250-0.281	59.70	57.20	....	73.00
0.312	59.70	57.20	....	69.60
0.344	58.50	....	....	....
Cold-finished				
0.375-0.547	58.80	57.50	70.10	65.50
0.563-0.688	58.80	57.50	66.70	61.60
0.750-1.000	57.40	56.00	61.00	58.10
1.063	57.40	56.00	....	56.10
1.125-1.500	55.20	53.90	59.00	54.10
Rolled				
1.563	53.70	52.40	....	....
1.625-2.000	53.10	51.60	....	....
2.125-2.500	51.70	50.30	....	....
2.563-3.375	50.20	48.70	....	....

Forging Stock: Round, Class 1, 43.30-55.90 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 48.10-63.20 in random lengths, 0.375-4 in. thick width 0.750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
⅜	$18.45	2	$ 57.00
1	29.00	4	157.20
1¼	39.25	6	281.65
1½	46.95	8	423.80

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	46.90-47.50	61.50-65.80
12-14	46.20-47.70	62.20-66.80
15-17	46.40-48.30	63.50-68.50
18-20	47.60-48.50	65.50-71.10

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.75; .125 in., 98.10; .188 in., 95.70; .250-2.0, 93.30. Thread plate, .188 in., 71.70; .250-2.0 in., 70.60; Tooling plate, .250-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
4-8	69.60-72.45	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.56	90.60-91.30
36-38	89.25-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 14.00-14.50; old sheets, 11.00-11.50; borings and turnings, 7.50-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	58.13b	55.36c	....	58.32	32.000	32.000	31.250
Yellow Brass	50.19	48.17d	50.73	53.19	24.625	24.375	22.625
Low Brass, 80%	53.40	53.34	53.94	54.21	27.375	27.125	26.625
Red Brass, 85%	54.54	54.48	55.06	57.34	28.500	28.250	27.750
Com. Bronze, 90%	56.23	56.17	56.77	58.79	29.500	29.250	28.750
Manganese Bronze	57.88	51.98	63.23	....	23.000	22.750	22.250
Muntz Metal	52.19	48.00	....	....	23.125	22.875	22.375
Naval Brass	54.14	48.48	61.20	57.55	23.000	22.750	22.250
Silicon Bronze	62.44	61.63	62.48	64.61	31.250	31.000	30.250
Nickel silver, 10%	66.66	58.99g	68.99	....	30.875	30.675	15.438
Phos. Bronze, A 5%	77.25	77.75	77.75	79.18	33.000	32.750	31.750

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

8.00; crankcases, 11.00-11.50; industrial castings, 11.00-11.50.

Copper and Brass: No. 1 heavy copper and wire, 27.00-27.50; No. 2 heavy copper and wire, 25.50-26.00; light copper, 23.00-23.50; No. 1 composition red brass, 24.00-24.50; No. 1 composition turnings, 23.00-23.50; yellow brass turnings, 13.00-13.50; new brass clippings, 21.00-21.50; light brass, 14.50-15.00; heavy yellow brass, 16.00-16.50; new brass rod ends, 18.00-18.50; auto radiators, unsweated, 17.50-18.00; cocks and faucets, 18.50-19.00; brass pipe, 19.00-19.50.

Lead: Heavy, 12.50-13.00; battery plates, 7.00-7.25; linotype and stereotype, 13.00-14.00; electrotype, 12.50-13.00; mixed babbitt, 13.00-14.50.

Monel: Clippings, 75.00-90.00; old sheets, 75.00-80.00; turnings, 70.00-80.00; rods, 75.00-90.00.

Nickel: Sheets and clips, 140.00-185.00; rolled anodes, 140.00-185.00; turnings, 125.00-160.00; rod ends, 140.00-185.00.

Zinc: Old zinc, 4.50-5.50; new die-cast scrap, 4.00-4.50; old die-cast scrap, 2.50-3.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 18.75-19.00; 3003 clippings, 18.75-19.00; 6151 clippings, 18.75-19.00; 5052 clippings, 18.25-19.00; 2014 clippings, 18.00-18.25; 2017 clippings, 18.00-18.25; 2024 clippings, 18.00-18.25; mixed clippings, 17.25-18.00; old sheets, 15.75-16.50; old cast, 15.75-16.25; clean old cable (free of steel), 17.75-19.00; borings and turnings, 15.50-17.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 58.00; light scrap, 54.00; turnings and borings, 38.00.

Copper and Brass: No. 1 heavy copper and wire, 30.25; No. 2 heavy copper and wire, 28.75; light copper, 26.50; refinery brass (60% copper) per dry copper content, 27.25.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 30.25; No. 2 heavy copper and wire, 28.75; light copper, 26.50; No. 1 composition borings, 27.00; No. 1 composition solids, 27.50; heavy yellow brass solids, 19.00; yellow brass turnings, 18.00; radiators, 21.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 54.79; oval, 53.92, 5000-10,000 lb; electrodeposited, 45.78; 3000-5000 lb lots; cast, 48.04, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 10-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab; less than 200 lb, 120.50; 200-499 lb 119.00; 500-999 lb, 118.50; 1000 lb or more, 118.00.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb, in 100-lb drums.

Chromic Acid: Less than 10,000 lb, 30.25, over 10,000 lb, 29.50.

Copper Cyanide: 100-1000 lb, 80.50.

Copper Sulphate: 500-1900 lb, 21.15; 2000 lb and over, 18.65.

Nickel Chloride: 10 lb, 46.50; 200 lb, 44.50; 300 lb, 43.50; 400-4900 lb, 41.50; 5000-9900 lb, 39.50; 10,000 lb and over, 38.50. Prices eastern delivery.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.25. Prices eastern delivery.

Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 72.30; 100-600 lb, 63.80; 700-1900 lb, 61.30; 2000-9900 lb, 59.60; 10,000 lb or more, 58.40.

Stannous Chloride (anhydrous): Less than 25 lb, 169.60; 25 lb, 134.60; 100 lb, 119.60; 400 lb, 117.10; 5200-19,500 lb, 104.30; 20,000 lb or more, 92.70.

Stannous Sulphate: Less than 50 lb, 132.20; 50 lb, 102.20; 100-1900 lb, 100.20; 2000 lb or more, 98.20.

Zinc Cyanide: Under 1000 lb, 85.56; 1000 lb and over, 53.55.

(*Concluded from page 91*)

cent of capacity; for the first 11 months, 87.5 per cent.

Demand for merchant iron is tapering off as the year end approaches. Many users have been engaged in an inventory reduction operation. Most foundries have received only a light flow of orders for first quarter delivery which has had an important influence on their pig iron buying program. An exception is the midwestern group of foundries which reports better demand from the automotive industry.

Steel Bars . . .

Bar Prices, Page 83

Although sales are not as heavy as the mills would like, hot-rolled bars are moving steadily into consumption. Auto needs are pick-

(5) 70 Ton Overhead Traveling CRANES

(2-P & H, 1-NILES, 2-MORGAN)

Each 70 ton bridge equipped with (2) 35 ton trolleys and 5 ton auxiliary hooks—74'8" span—230 volt D.C. Cab operated—available for current delivery—excellent condition—fraction of replacement cost. Location Phila.

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PHILADELPHIA NATIONAL BANK BLDG., PHILA. 7, PA. Rittenhouse 6-7455

INDUSTRIAL ENGINEERS

Multi-Million dollar expansion of our operating facilities has created opportunities in industrial engineering for young men trained or experienced in wage incentive programming, methods engineering, and statistical quality control.

1 to 3 years experience will qualify. Professional status assured. Openings at our Fontana plant in Southern California.

Send complete resume to Employment Manager

KAISER STEEL CORP.

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wishes to build U. S. designed equipment for the Canadian market, under license or otherwise. Can also handle sale if no conflict with existing lines. Facilities include engineering department, pattern shop, foundry, 300-man modern machine shop, including 9 boring mills, 6 gear machines, structural and assembly shops. 50-page brochure available on request.

Box 497
STEEL, Penton Building
Cleveland 13, Ohio

CLASSIFIED

Help Wanted

CHIEF DESIGN ENGINEER—Mechanical Engineer degree preferred—Broad experience required for design of facilities for integrated steel plant located in Southwest. Excellent opportunity in a well established, fast expanding organization. Pension plan, group hospitalization, vacation, sick leave, etc. Submit complete personal and professional resume in first letter. Reply Box 496, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

SUPERINTENDENT: Factory Mgr., Stamping, related operations, excelling in scheduling, tooling, tool design, composite experience, progressive, deep drawn. Prefer small firm. Moderate salary plus % on increased production. Age 44, sober, highest integrity. Box 499, STEEL, Penton Bldg., Cleveland 13, Ohio.

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And Further Information write
STEEL, Penton Bldg., Cleveland 13, O.

METALLURGIST

A long established manufacturer of drop forgings desires young graduate metallurgist, preferably with 3-5 years aircraft forging experience, primarily on ferrous metals. Reply stating age, educational background, experience and salary requirements.

The Billings & Spencer Company
1 Laurel Street, Hartford, Conn.
Attention—President

WANTED

Sales representative with marine experience to sell steel containers. Write Sales Mgr.

JETA METAL FABRICATORS
Yonkers, N. Y.
Enclose resume.

ing up, chiefly for February and March. Forging shop requirements for first quarter show signs of improving, chiefly reflecting better auto business.

Sales to the construction industry continue strong, and the seasonal slump in this area of consumption appears to be much less severe than usual.

In general, bar demand continues below mill capacity and only a few of the larger hot-rolled bar sizes are considered in tight supply.

Contrasting with the improved demand from some areas of consumption, sales to the makers of agricultural implements and manufacturers of appliances remain limited.

Structural Shapes . . .

Structural Shape Prices, Page 83

Structural fabricating shops are estimating less work. Some of them have practically withdrawn from the market except for long-term delivery tonnage (late 1957 or 1958). The reason: Uncertainty of steel deliveries.

The shortage of plain material, including standard shapes, is a severe handicap to the fabricators in maintaining orderly production schedules. Shipments from the mills to the fabricators have improved somewhat, notably in New England, but relatively little betterment in fabricating schedules is yet possible, though in more cases shops are not losing ground.

Warehouse . . .

Warehouse Prices, Page 88

Distributors report the Christmas holidays reduced demand for steel more than usual. But they could sell more plates and shapes if supplies were available. The situation in these two products remains critical.

The prevailing practice this year is for small businesses to close both their plants and offices on Dec. 24, making a four-day shutdown in most instances. With the shutdowns cutting into production this month, demand from consumers has declined for sheets, bars and pipe.

Although there are rumors that the sheet market will tighten late in the first quarter, consumers are not worried about their stocks.

Stainless Steel . . .

Stainless Steel Prices, Page 87

An increase in base prices on its various grades of nickel-bearing stainless steel was announced last week by U.S. Steel Corp. This action followed upward adjustments on stainless effected by other producers over the past ten days.

U.S. Steel's increases range from ¾ to 6 cents a pound. They are in line with the changes effected by the other producers.

The other producers to announce stainless price advances recently include: Republic Steel Corp., Cleveland; Allegheny Ludlum Steel Corp., Pittsburgh; Crucible Steel Co. of America, Pittsburgh.

Plates . . .

Plate Prices, Page 83

An increasing number of consumers are seeking to make conversion deals in an effort to obtain larger tonnages of plates for second quarter. Plate producers have not yet opened their books for that period, but it is certain they won't have enough tonnage to meet all of the demand already in prospect, not taking into account a possible sharp increase in shipbuilding requirements.

Light plates are not as difficult to obtain as the heavier product. If the government ups rated orders on shipbuilding account, it is likely that much larger tonnages of light plates will be rolled on the continuous sheet and strip mills.

Currently, platemakers say they will enter first quarter with carryovers of two weeks in light plates and up to eight weeks in the heavy gages.

Colorado Fuel & Iron Corp. last week raised carbon steel plate prices $7 a ton to a new base of $114 per ton, Claymont, Del.

Lukens Steel Co., Coatesville, Pa., advanced prices on Inconel, nickel, low carbon nickel and Monel clad plates, effective Dec. 17. Reason: higher nickel prices.

Weldment shops are well booked up and are gearing operations to plate availability.

Bethlehem Steel Co.'s Quincy yard has booked three oil tankers, one of 100,000 deadweight tons, largest ever projected, and two 46,000-ton vessels. Negotiations are under way for two additional 100,000-ton tankers.

Newport News Shipbuilding & Dry Dock Co. signed a contract last week to build two 51,000-ton supertankers for Jompania Naviera Hesperia S. A., a Swiss controlled Panamanian corporation. This brings Newport News Shipbuilding's backlog of supertankers to 12. It is estimated the two vessels will cost in excess of $20 million. The two 707-ft single screw ships will have 22,000-hp steam turbines, and a speed of 17 knots.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

36,000 tons, Galbreath-Ruffin Corp., office building, 33 W. 51st St., New York; contract reported placed.

27,120 tons, office building 15 *(Time-Life)*, Rockefeller Plaza, New York, through George A. Fuller Co. and Henry Lowery, general contractors, to Bethlehem Steel Co., Bethlehem, Pa.

2700 tons, superstructure, 5-span deck girder bridge, Pawtucket, R. I., to Harris Structural Steel Co. Inc., New York, $2,773,792; bids direct to the state department of purchases, R.I. 5455, contract 2; Bethlehem Steel Co., Bethlehem, $2,877,753; Phoenix Bridge Co., Phoenixville, Pa., $2,949,340.

2730 tons, fashion school and college, Municipal Board of Education, New York, through the Depot Contracting Corp. to Schacht Steel Construction Inc., New York.

2100 tons, power transmission towers, Connecticut Light & Power Co., various locations, to the Bethlehem Steel Co., Bethlehem, Pa.

2000 tons, state bridge, Erie county, New York, through the Union Building & Construction Corp., to the Ernst Iron Works, Buffalo.

1800 tons, state bridge, York county, to Phoenix Bridge Co., Phoenixville, Pa.

1320 tons, state bridge work, FAHHE, 56-2, Queens, New York, through Tully & Di Napoli Inc., general contractor to the Harris Structural Steel Co., New York.

900 tons, manufacturing building, Square-D Co., Lexington, Ky., to R. C. Mahon Co., Detroit; Struck Construction Co., Louisville, is general contractor.

500 tons, plant addition, Johns Manville Corp., Chicago, to an unnamed fabricator.

490 tons, state bridge, Munroe county, New York, through Lane Construction Corp., Meriden, Conn., to the Bethlehem Steel Co., Bethlehem, Pa.

425 tons, shop building addition, Redstone Arsenal, Huntsville, Ala., to Decatur Iron & Steel Co., Decatur, Ala.; J. A. Jones Construction Co., Atlanta, general contractor; 35 tons, reinforcing, Ceco Steel Products Co., Atlanta.

165 tons, building, *Reading Eagle*, Reading, Pa., to the Modern Iron Works, that city.

155 tons, laboratory wing addition, Lockheed Aircraft Corp., Dawsonville, Ga., to Structural Steel Inc., Roanoke, Va.; Southeastern Construction Co., Atlanta, Ga., general contractor; 90 tons, reinforcing, Ceco Steel Products Co., Atlanta.

STRUCTURAL STEEL PENDING

4440 tons, state bridge work, FICWE-56-1, Westchester county, New York; Rusciano & Son Corp., and De Baiso Construction Corp., low jointly on the general contract.

4250 tons, state office buildings, Baltimore; Blake Construction Co., Baltimore, is low on general contract.

1200 tons, hangars and facilities, Dow AFB, Bangor, Me., Grand Iron Works, New York, low; bids direct, fabricating and erecting, Corps of Engineers, Boston.

1070 tons, state bridge work, BT-56-2, Columbia county, New York; Union Building & Construction Corp., Passaic, N. J., low on general contract.

870 tons, hangar and facilities, Navy Flying Center, Willow Grove, Pa., Wark & Co., Philadelphia, low on general contract.

835 tons, state bridge work, BT-56-7, Erie county, New York; Johnson, Drake & Piper, Buffalo, low on general contract.

678 tons, state bridge work, BT-56-4, Albany county, New York; Lane Construction Corp., Meriden, Conn., low on general contract.

657 tons, state bridge work, BT-56-3 Rensselaer county, New York; Grand View Construction Co., Mt. Vernon, N. Y., low on general contract.

630 tons, North Illinois toll route, contract N-6B, Hanover and Schaumberg townships, Cook county, Ill., for the Illinois State Toll Highway Commission, Chicago; bids Jan. 10.

565 tons, state bridge, contract LR 78, Lehigh county, Pa.; Fred Kessler, Hazleton, Pa., low on general contract.

540 tons, miscellaneous items, Ice Harbor dam; bids in to the U.S. Engineer, Walla Walla, Wash.

410 tons, state bridge work, PPC-59-42, Westchester county, New York; Berlanti Construction Co., Harrison, N. Y., low on general contract.

400 tons, North Illinois toll route contract N-7A, including four bridge structures, Elk Grove township, Cook county, Ill., for Illinois State Toll Highway Commission, Chicago; bids Jan. 3.

375 tons, angles, Raritan Arsenal, Metuchen, N. J.; bids Dec. 27.

340 tons, state bridge, contract LR 36008, Lancaster county, Pa.; Ed Taylor, Coatesville, Pa., low on general contract.

329 tons, state bridge work in Livingston county, New York; will probably be up for readvertising as no general contractors' bids were received.

250 tons, Argonne low power reactor, for Atomic Energy Commission, Idaho Falls, Idaho; plans ready Jan. 2, bids in February.

227 tons, state bridge work, Erie county, New York; no bids received on general contract; to be readvertised.

125 tons, state bridge, contract LR 39109, Lehigh county, Pa.; J. Richard Nessley, Landisville, Pa., low on general contract.

105 tons, state bridge work, FARC-56, Nassau county, New York; Henderson Bros. Inc., Valley Stream, N. Y., low on general contract.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1085 tons, maximum security building, St. Elizabeth's Hospital, Washington, to Bethlehem Steel Co., Bethlehem, Pa.; William E. Creamer Co. Inc., Washington, general contractor; structurals, Atlas Machine & Iron Works Inc.

795 tons, buildings, Providence Hospital, Holyoke, Mass., to Joseph T. Ryerson & Son Inc., Boston; Daniel O'Connell's Sons Inc., Holyoke, Mass., general contractor.

600 tons, municipal parking garage, Boston, to Northern Steel Inc., Medford, Mass.; S.&A. Allen Construction Co. Inc., Boston, general contractor.

150 tons, addition, Our Lady of Lourdes Hospital, Lafayette, La., to Joseph H. Fox Co. Inc., Birmingham; Farnsworth & Chambers Co. Inc., New Orleans, general contractor.

130 tons, building, Square-D Co., Lexington, Ky., to American Builders Co., Louisville; Struck Construction Co., Louisville, general contractor.

100 tons, buildings, AFB, Topsham, Me., to Bancroft & Martin Rolling Mills Co., South Portland, Me.; Consolidated Constructors Inc., Portland, Me., general contractor.

PLATES . . .

PLATES PLACED

250 tons, 500,000-gal elevated water storage tank, Arlington, Va., to the Hammond Iron Works, Warren, Pa.

PLATES PENDING

270 tons, 600,000-gal elevated water tank, 48-in. riser, Veterans' Hospital, Roanoke, Va.; bids Jan. 15, Veterans' Administration, Washington.

100 tons plus, 1-million-gal storage tank, Vera Irrigation District No. 15, Spokane, Wash.; Chicago Bridge & Iron Co., Seattle, is low at $47,900, delivery 350 days; American Pipe & Construction Co., Portland, Oreg., low at $49,795, delivery 210 days.

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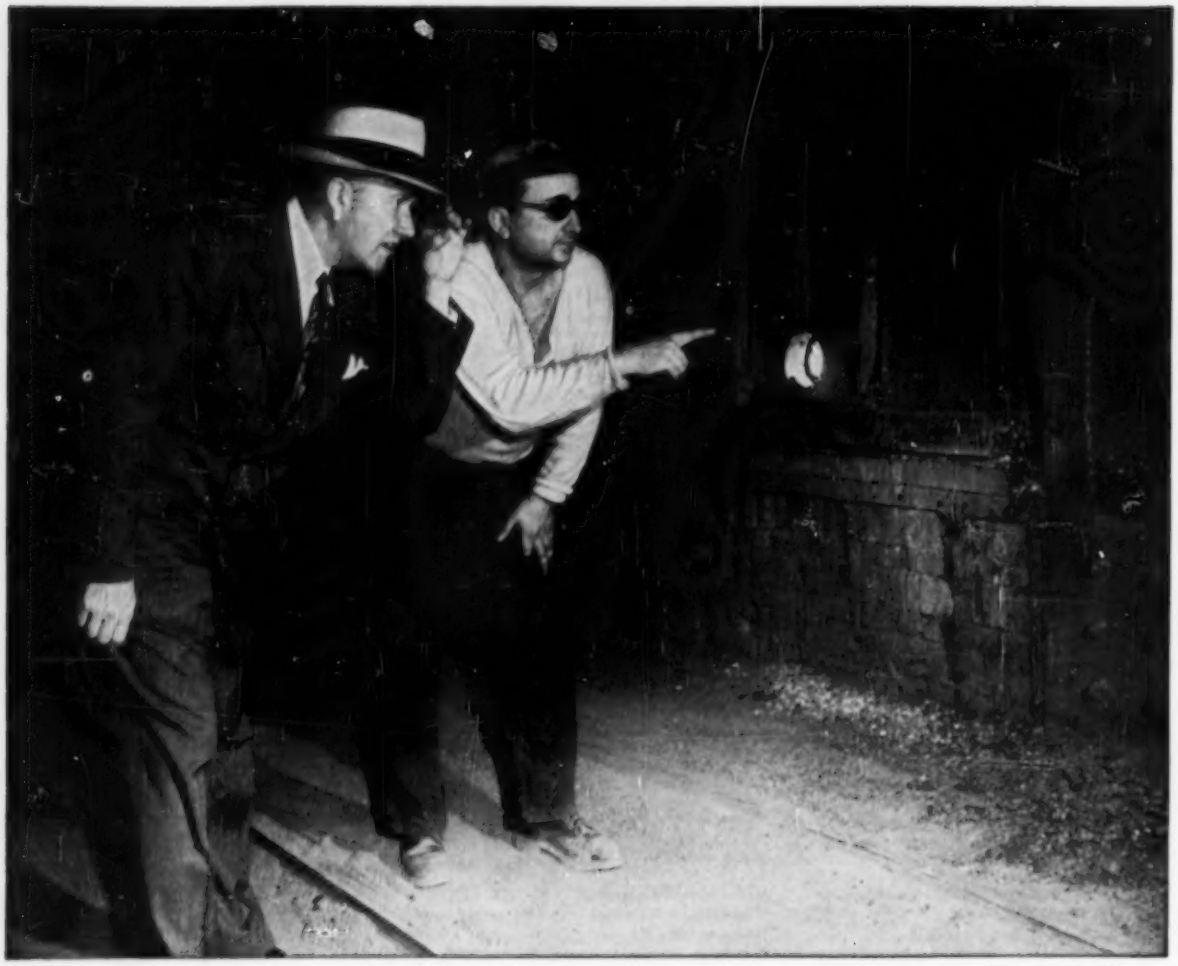
Cancer can't strike me, I'm hiding.

What I don't know won't hurt me.

Cancer?

Lots of people die of it, I know . . . but the American Cancer Society says a great many deaths from cancer are NEEDLESS deaths. That's why I do what they tell me. I have an annual medical checkup however well I feel. I know the seven danger signals. And when I want sound information, I get it from my Unit of the

AMERICAN CANCER SOCIETY



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says CLIFFORD F. HOOD, President, United States Steel Corporation

"Producing quality steel in quantities to meet today's tremendous needs is a complex technical job. An army of specialists with precision equipment has replaced the old-time melter and roller. It is the *knowledge and ability* of these men and women of specialized skills which has enabled America's steel industry to outproduce the world.

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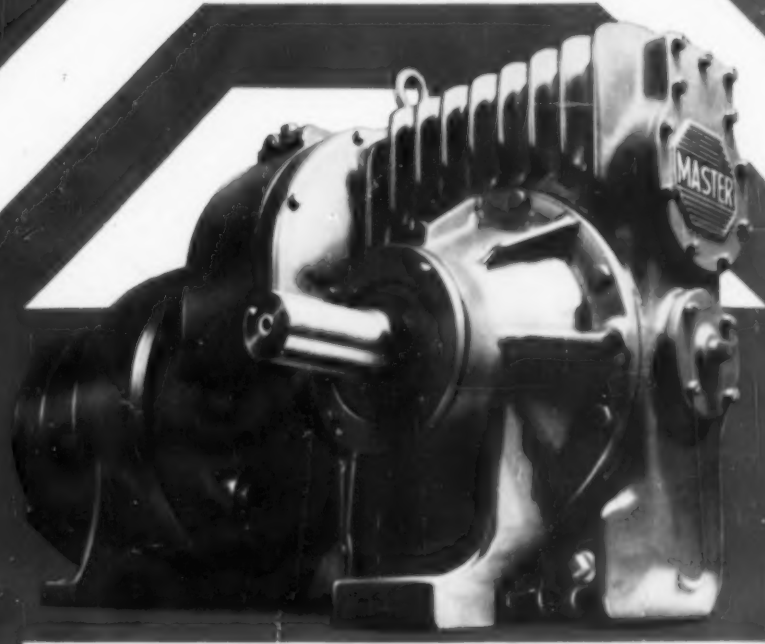
Master Gearmotors have given more millions of hours of satisfactory service in the field than all other makes combined.



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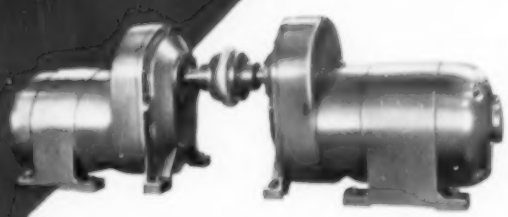
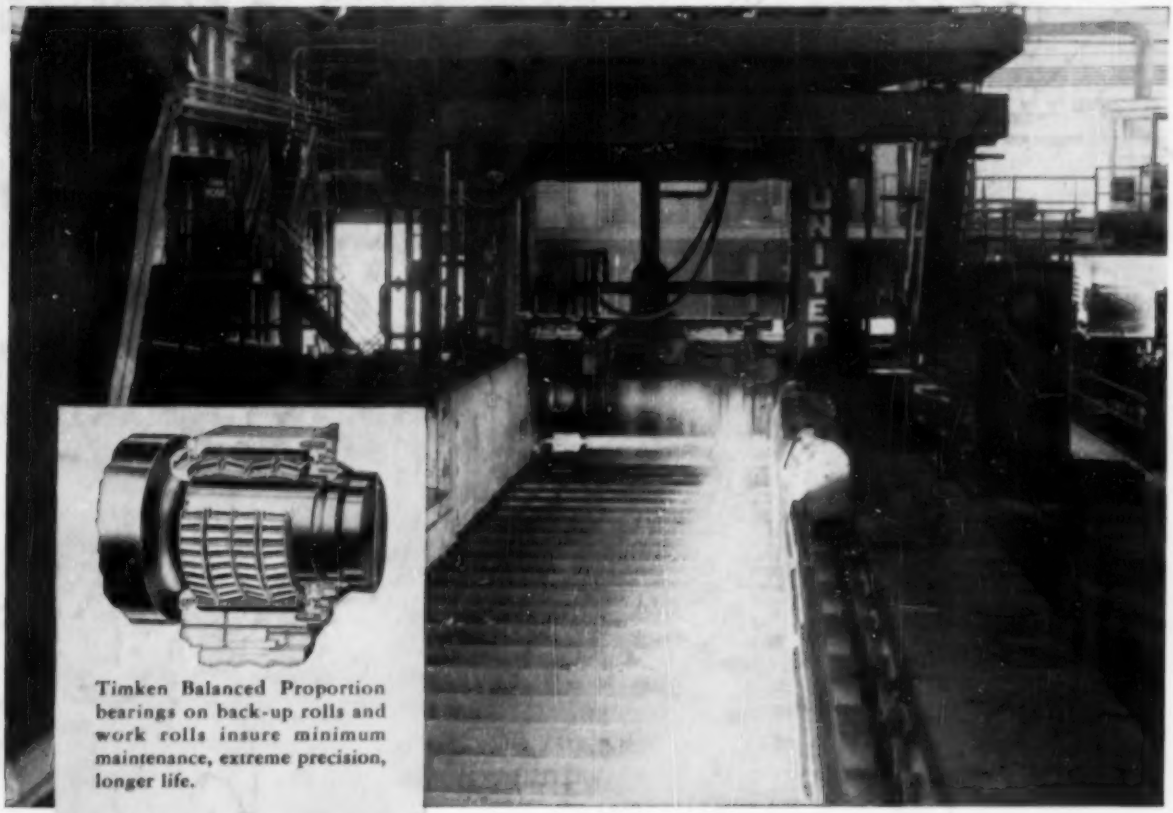


How can *we* help YOU?

For five years without stopping, these two 326 frame single reduction gearmotors were run continuously 24 hours a day at full load, one as an induction generator, the other as a gearmotor. When shut down and inspected, Master's conservative design showed *gear wear of less* than .001".

THE MASTER ELECTRIC COMPANY • Dayton 1, Ohio



Timken Balanced Proportion bearings on back-up rolls and work rolls insure minimum maintenance, extreme precision, longer life.

2-high bloom and slab mill starts faster, drives easier on TIMKEN® balanced proportion bearings

WITH the roll necks on this 2-high bloom and slab mill—built by United Engineering & Foundry Company for Pittsburgh Steel's Monessen, Pa., plant—mounted on Timken® balanced proportion bearings, friction is practically eliminated. This means lower starting resistance, faster acceleration, easier roll drive and higher rolling speeds. And because the balanced proportion design of Timken bearings permits larger diameter roll necks with no increase in bearing O.D., roll neck strength is increased up to 60%—load ratings up to 40%.

No special thrust bearings are needed; Timken bearings take radial and thrust loads in any combination. And full line contact between the rollers and races of Timken bearings gives them extra load-carrying capacity. Complicated lubrication systems are eliminated, too; Timken bearings permit simple, economical grease lubrication. Rolls can be changed quickly and easily. Wear is greatly reduced, long life is assured. Timken bearings are designed geometrically to *roll true* . . . and are precision-manufactured, under the most rigid quality controls, to conform to their design. Timken bearings show lowest cost per ton of steel rolled.

Always specify Timken balanced proportion roll neck bearings. For full details, consult our roll neck specialists. Write to: The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

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